KALASALINGAM
ACADEMY OF RESEARCH AND EDUCATION
(DEEMED TO BE UNIVERSITY)
Under sec. 3 of UGC Act 1956. Accredited by NAAC with "A" Grade

Anand Nagar, Krishnankoil - 626126, Srivilliputtur (via), Virudhunagar District, Tamilnadu.

APPLICATION FOR ADMISSION TO Ph.D. PROGRAMMES

Date of Application:10-09-2025

Department	COMPUTER APPLICATIONS	Application No.	2025010407
Area of Research	AI & ML	Research Mode	FULL TIME

Name :B.RAVICHANDRAN

Date of Birth / Age :21-02-1984 / 41 Years

Gender :MALE

Category :BC

e-Mail ID :perfectravi@gmail.com

Mobile :4693678232

Father's/Husband's Name	P.BALASHANMUGAM	Father's/Husband's Occupation	RETIRED
Family Income	18,00,000	Residental Type	RURAL
Birth Place	ERODE	Mother Tongue	TAMIL
Religion	HINDU	Martial Status	MARRIED
Aadhaar No.	N/A	PAN No.	AXJPR2425A
Physically Challenged	NO	Type of Disability	-

Address for Communication:
2960
CALDERDALE CT
PROSPER
COLLIN DISTRICT
TEXAS
UNITED STATES OF AMERICA
Pin-75078

Permenant Address:
2960
CALDERDALE CT
PROSPER
COLLIN DISTRICT
TEXAS
UNITED STATES OF AMERICA
Pin-75078

Qualification

Degree	Discipline	College/university	Year Passed	AVG/CGPA	Class	Mode
B.SC	COMPUTER TECHNOLOGY	KONGU ENGINEERING COLLEGE / ANNA UNIVERSITY	2005	70	FIRST CLASS	REGULAR
MCA	COMPUTER APPLICATIONS	K.S.RANGASAMY COLLEGE OF TECHNOLOGY/ ANNA UNIVERSITY	2008	83	FIRST CLASS WITH DISTINCTION	REGULAR

Experience

Organization	Designation	Experience From	Experience TO	Work Nature
BANK OF AMERICA	VICE PRESIDENT	2022-12-05	2025-09-09	
PENNY MAC	SR APPLICATIONS DEVELOPER	2021-11-22	2022-12-01	
RANDSTAD TECHNOLOGIES	SR SOFTWARE DEVELOPER	2019-10-18	2021-11-19	
COGNIZANT TECHNOLOGY SOLUTION	SA	2013-01-16	2019-10-17	

Payment Details

Transaction ID	Reference	Date of transaction	Amount	Status
2025010407_250922072608	BHD1HBY0WXXNF8	22-09-2025	600	SUCCESS

Transaction ID	Reference	Date of transaction	Amount	Status
2025010407_250922072608	BHD1HBY0WXXNF8	22-09-2025	600	SUCCESS

Research Candidate Name: Ravichandran Balashanmugam

Title

"Explainable Machine Learning for Credit Risk Assessment and Fraud Detection in Banking"

Abstract

The rapid adoption of Artificial Intelligence (AI) and Machine Learning (ML) in banking has transformed credit underwriting, fraud prevention, and customer risk profiling. However, most high-performing models (e.g., gradient boosting, deep learning) operate as "black boxes," limiting transparency for regulators and customers. This research proposes an explainable ML framework that balances predictive accuracy, interpretability, and fairness for credit risk and fraud detection. The project will investigate hybrid architectures combining tree-based ensembles, SHAP/LIME explanations, and counterfactual reasoning to generate human-readable insights while maintaining strict regulatory compliance.

Background & Problem Statement

Financial institutions must make thousands of risk-related decisions daily: loan approvals, credit line adjustments, fraud alerts, and anti-money-laundering checks. Traditional statistical scoring models (e.g., logistic regression) provide clarity but underperform in complex data settings, whereas advanced ML achieves superior accuracy but sacrifices explainability. This trade-off challenges compliance with Basel III, GDPR "right to explanation," and the US Equal Credit Opportunity Act, which require transparency and bias mitigation in automated decisions.

Current research focuses on post-hoc explanation techniques or simplified surrogate models, yet these approaches often fail to preserve fidelity under production conditions. There is a clear need for an end-to-end pipeline that integrates interpretability into the model design, enabling practitioners to deploy high-performance systems that remain auditable, fair, and trusted.

Research Objectives

1. Design an explainable ML architecture for credit risk scoring and fraud detection that achieves >95% of the accuracy of state-of-the-art black-box models.

2. Evaluate interpretability using quantitative metrics (e.g., fidelity, stability) and qualitative assessments by risk officers.

3. Develop bias-detection modules to ensure fairness across demographic groups while preserving predictive strength.

4. Prototype a visualization dashboard that enables analysts and regulators to explore model reasoning in real time.

Proposed Methodology

- **Data Acquisition & Preprocessing:** Use anonymized banking datasets (loan applications, transaction histories, fraud logs) with proper consent and security controls. Handle imbalance via SMOTE/undersampling.

- **Model Development:** Compare tree-based ensembles (XGBoost, LightGBM), explainable neural networks (tabNet, self-interpretable attention layers), and hybrid scorecards.

- **Explainability Layer:** Apply SHAP values, Integrated Gradients, and counterfactual analysis to provide local & global explanations.

- **Fairness Auditing:** Implement fairness metrics (equal opportunity, disparate impact) and post-processing algorithms (reject-option classification).

- **Evaluation:** Measure AUC, precision-recall, explanation fidelity, and user interpretability through surveys of credit analysts.

- **Prototype Interface:** Build a lightweight dashboard (e.g., Streamlit) to visualize predictions, feature attributions, and fairness indicators.

Expected Outcomes & Contributions

- A validated framework for explainable credit scoring and fraud detection that meets regulatory standards.

- Practical guidance for banks on balancing accuracy, fairness, and interpretability.

- Open-source reference implementation for research and educational use.

- Enhanced customer trust and regulator confidence in AI-driven financial services.

References (Selected)

- Lundberg, S. & Lee, S. (2017). *A Unified Approach to Interpreting Model Predictions (SHAP).*

- Ribeiro, M. T., Singh, S., & Guestrin, C. (2016). *"Why Should I Trust You?" Explaining Classifiers.*

- European Banking Authority (2023). *Guidelines on the Use of Machine Learning in Credit Risk.*
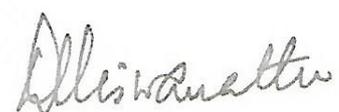
Anna University

PROGRESS THROUGH KNOWLEDGE

The Syndicate of the Anna University hereby makes known that

RAVICHANDRAN B *has been admitted to the* **DEGREE OF BACHELOR OF SCIENCE** *in* **Applied Science-Computer Technology** *having satisfactorily completed the prescribed programme of study and having been certified by duly appointed examiners to be qualified to receive the same and having been placed by them in the* **First Class** *at the Examination held in* **APRIL 2005.**

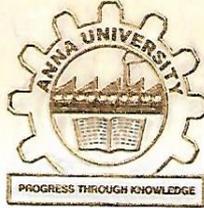*Given under the Seal of the University*

Chennai 600 025
India
November 2005

BUM737533

Registrar

Vice-Chancellor

Anna University Chennai

Reg No.60705621037/RG

The Syndicate of the Anna University Chennai hereby makes known that

RAVICHANDRAN B *has been admitted to the* **DEGREE OF MASTER OF COMPUTER APPLICATIONS** *under the* **Faculty of Information and Communication Engineering**, *having completed the prescribed programme of study and having been certified by the duly appointed examiners to be qualified to receive the same, and has been placed in* **FIRST CLASS WITH DISTINCTION** *at the Examination held in* **JUNE 2008.**

Given under the Seal of the University
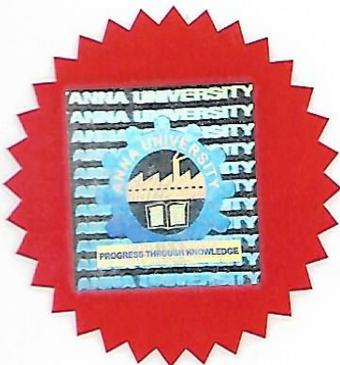
Chennai 600 025
India
December 2008

Controller of Examinations

Registrar

Vice-Chancellor

ANNA UNIVERSITY

CHENNAI - 600 025

PROVISIONAL CERTIFICATE

Folio No. : **B470875**

This is to certify that the undermentioned candidate has qualified for the award of Degree as detailed below :

Name	:	**RAVICHANDRAN B**
Register No.	:	**71102306024**
Degree	:	**B.Sc. Applied Science**
Branch/ Specialisation	:	**Computer Technology**
Month & Year of Passing	:	**Apr 2005**
Classification	:	**FIRST CLASS**

Chennai – 600 025.

Date : **03/09/2005**

for Controller of Examinations

ANNA UNIVERSITY CHENNAI

CHENNAI - 600 025

PROVISIONAL CERTIFICATE

Folio No. : F422607

This is to certify that the undermentioned candidate has qualified for the award of Degree as detailed below :
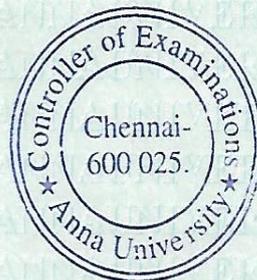
Name	:	RAVICHANDRAN B
Register No.	:	60705621037
Degree	:	M.C.A.
Branch/ Specialization	:	__
Month & Year of Passing	:	June 2008
Classification	:	FIRST CLASS WITH DISTINCTION
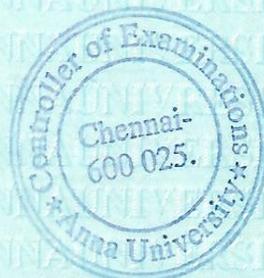
Chennai – 600 025.

Date : 07/08/2008

R050701228B

Controller of Examinations

ANNA UNIVERSITY, CHENNAI

Folio No. B470875

B.Sc. DEGREE EXAMINATIONS

CONSOLIDATED STATEMENT OF MARKS

NAME OF THE CANDIDATE	RAVICHANDRAN B	REGISTER NO.	71102306024
COLLEGE OF STUDY	711: Kongu Engineering College	MONTH & YEAR OF LAST APPEARANCE	Apr 2005
PROGRAMME & BRANCH	B.Sc. Applied Science-Computer Technology	REGULATIONS	2002

SEM.	SUBJECT CODE	SUBJECT TITLE	MAX	MIN	MARKS SECURED	MONTH & YEAR OF PASSING	SEM.	SUBJECT CODE	SUBJECT TITLE	MAX	MIN	MARKS SECURED	MONTH & YEAR OF PASSING
01*	97CT101	English	100	50	058	APR 2003	06	97CTE08	Internet and Java Programming	100	50	066	APR 2005
01*	97CT102	Applied Mathematics I	100	50	058	NOV 2003	06	97CTE10	Web Technology	100	50	065	APR 2005
01*	97CT103	Applied Mathematics II	100	50	080	APR 2003	06	97CT605	Elective Lab - III	100	50	093	APR 2005
01*	00CT104	Applied Physics	100	50	067	APR 2003	06	97CT606	PROJECT	200	100	186	APR 2005
01*	97CT105	Basics of Electrical Sciences	100	50	060	APR 2003							
01*	97CT106	Digital Electronics	100	50	055	APR 2003							
01*	97CT107	Computer Concepts & Problem Solving	100	50	054	APR 2003							
01*	97CT108	Engineering Drawing &Graphics	100	50	092	APR 2003							
01*	97CT109	Programming Lab(C Lang.)	100	50	090	APR 2003							
01*	97CT110	Electrical & Digital Electronics Lab	100	50	076	APR 2003							
03	97CT301	Applied Mathematics - III	100	50	052	NOV 2003							
03	97CT302	Computer Architecture - I	100	50	052	APR 2004							
03	97CT303	Principles of Operating Systems	100	50	058	NOV 2003							
03	97CT304	Fundamentals of Microprocessors	100	50	054	NOV 2003							
03	97CT305	Computers in Business Applications	100	50	066	NOV 2003							
03	97CT306	Data Structures	100	50	066	NOV 2003							
03	97CT307	Microprocessor & Interfacing Lab	100	50	092	NOV 2003							
03	97CT308	Data Processing Lab	100	50	088	NOV 2003							
04	97CT401	Discrete Mathematics	100	50	071	APR 2004							
04	97CT402	Object Oriented Programming & C++	100	50	075	APR 2004							
04	97CT403	Computer Architecture - II	100	50	063	APR 2004							
04	97CT404	Accounting & Financial Management	100	50	051	APR 2004							
04	97CT405	Database Management Systems	100	50	058	APR 2004							
04	97CT406	Systems Software	100	50	061	APR 2004							
04	97CT407	RDBMS Lab (X Base, Oracle)	100	50	072	APR 2004							
04	97CT408	Systems Software Lab	100	50	096	APR 2004							
05	97CT501	Computer Networks	100	50	063	NOV 2004							
05	97CT502	Unix & Network Operating Systems	100	50	062	NOV 2004							
05	97CT503	PC Testing & Trouble Shooting	100	50	072	NOV 2004							
05	97CT504	Software Engineering	100	50	063	NOV 2004							
05	97CTE01	E - Commerce	100	50	064	NOV 2004							
05	97CTE04	Client Server Computing & Visual C++	100	50	071	NOV 2004							
05	97CT507	Object Oriented Programming Lab (C++)	100	50	088	NOV 2004							
05	97CT508	PC Testing & Trouble Shooting Lab	100	50	083	NOV 2004							
06	97CT601	Windows Programming	100	50	057	APR 2005							
06	97CT602	Computer Graphics	100	50	069	APR 2005							

End of Statement

* Annual Pattern

Classification : FIRST CLASS

Total Marks : 2867 / 4100

Percentage (rounded to nearest integer) : 70

Medium of Instruction : ENGLISH

Chennai - 600 025.

Date : 08/09/2005

Controller of Examinations

ANNA UNIVERSITY
CHENNAI
M.C.A. DEGREE EXAMINATIONS

CONSOLIDATED STATEMENT OF MARKS

NAME OF THE CANDIDATE	RAVICHANDRAN B		REGISTER NO.	60705621037
COLLEGE OF STUDY	607: K.S.Rangasamy College of Technology		MONTH & YEAR OF LAST APPEARANCE	June 2008
PROGRAMME & SPECIALIZATION	M.C.A.		REGULATIONS	2005

SEM.	SUBJECT CODE	SUBJECT TITLE	MAX	MIN	MARKS SECURED	MONTH & YEAR OF PASSING
01	MC1601	Computer Organization	100	50	060	NOV 2005
01	MC1602	Problem Solving and Programming	100	50	069	NOV 2005
01	MC1603	Business Processes	100	50	080	NOV 2005
01	MC1604	Data Structures	100	50	072	NOV 2005
01	MC1605	Accounting and Financial Management	100	50	061	NOV 2005
01	MC1606	Data Structures Lab	100	50	097	NOV 2005
01	MC1607	Programming Lab	100	50	097	NOV 2005
02	MC1651	Mathematical Foundations of Computer Science	100	50	064	JUN 2006
02	MC1652	Object Oriented Programming	100	50	073	JUN 2006
02	MC1653	Design and Analysis of Algorithms	100	50	075	JUN 2006
02	MC1654	Database Management Systems	100	50	097	JUN 2006
02	MC1655	Operating Systems	100	50	077	JUN 2006
02	MC1656	Object Oriented Programming Lab	100	50	098	JUN 2006
02	MC1657	DBMS Lab	100	50	092	JUN 2006
02	MC1658	Alogorithms Lab	100	50	094	JUN 2006
03	MC1701	Computer Networks	100	50	082	NOV 2006
03	MC1702	Microprocessors and its Applications	100	50	075	NOV 2006
03	MC1703	Software Engineering	100	50	075	NOV 2006
03	MC1704	Computer Graphics and Multimedia Systems	100	50	072	NOV 2006
03	MC1705	Internet Programming	100	50	086	NOV 2006
03	MC1706	Graphics and Multimedia Lab	100	50	097	NOV 2006
03	MC1707	Microprocessor Lab	100	50	095	NOV 2006
03	MC1708	Internet Programming Lab	100	50	098	NOV 2006
04	MC1751	UNIX and Network Programming	100	50	061	JUN 2007
04	MC1752	Resource Management Techniques	100	50	071	JUN 2007
04	MC1753	Object Oriented Analysis and Design	100	50	074	JUN 2007
04	MC1754	Middle-Ware Technologies	100	50	074	JUN 2007
04	MC1622	Electronic Commerce	100	50	073	JUN 2007
04	MC1755	Visual Programming Lab	100	50	096	JUN 2007
04	MC1756	Unix and Network Programming Lab	100	50	097	JUN 2007
04	MC1757	Middleware Lab	100	50	098	JUN 2007
05	MC1801	XML and Web Services	100	50	078	NOV 2007
05	MC1802	Software Project Management	100	50	081	NOV 2007
05	MC1627	Software Quality Management	100	50	071	NOV 2007
05	MC1630	Data Warehousing and Data Mining	100	50	080	NOV 2007
05	MC1633	Mobile Computing	100	50	074	NOV 2007
05	MC1803	XML and Web Services Lab	100	50	098	NOV 2007
05	MC1804	Software Development Lab	100	50	097	NOV 2007
06	MC1851	Project Work	400	200	396	JUN 2008

End of Statement

Classification : **FIRST CLASS WITH DISTINCTION**

Total Marks : 3505 / 4200

Percentage (rounded to nearest integer) : 83

ANNA UNIVERSITY, CHENNAI

Folio No. B470875

B.Sc. DEGREE EXAMINATIONS

CONSOLIDATED STATEMENT OF MARKS

NAME OF THE CANDIDATE	RAVICHANDRAN B	REGISTER NO.	71102306024
COLLEGE OF STUDY	711: Kongu Engineering College	MONTH & YEAR OF LAST APPEARANCE	Apr 2005
PROGRAMME & BRANCH	B.Sc. Applied Science-Computer Technology	REGULATIONS	2002

SEM.	SUBJECT CODE	SUBJECT TITLE	MAX	MIN	MARKS SECURED	MONTH & YEAR OF PASSING
01*	97CT101	English	100	50	058	APR 2003
01*	97CT102	Applied Mathematics I	100	50	058	NOV 2003
01*	97CT103	Applied Mathematics II	100	50	080	APR 2003
01*	00CT104	Applied Physics	100	50	067	APR 2003
01*	97CT105	Basics of Electrical Sciences	100	50	060	APR 2003
01*	97CT106	Digital Electronics	100	50	055	APR 2003
01*	97CT107	Computer Concepts & Problem Solving	100	50	054	APR 2003
01*	97CT108	Engineering Drawing &Graphics	100	50	092	APR 2003
01*	97CT109	Programming Lab(C Lang.)	100	50	090	APR 2003
01*	97CT110	Electrical & Digital Electronics Lab	100	50	076	APR 2003
03	97CT301	Applied Mathematics - III	100	50	052	NOV 2003
03	97CT302	Computer Architecture - I	100	50	052	APR 2004
03	97CT303	Principles of Operating Systems	100	50	058	NOV 2003
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03	97CT305	Computers in Business Applications	100	50	066	NOV 2003
03	97CT306	Data Structures	100	50	066	NOV 2003
03	97CT307	Microprocessor & Interfacing Lab	100	50	092	NOV 2003
03	97CT308	Data Processing Lab	100	50	088	NOV 2003
04	97CT401	Discrete Mathematics	100	50	071	APR 2004
04	97CT402	Object Oriented Programming & C++	100	50	075	APR 2004
04	97CT403	Computer Architecture - II	100	50	063	APR 2004
04	97CT404	Accounting & Financial Management	100	50	051	APR 2004
04	97CT405	Database Management Systems	100	50	058	APR 2004
04	97CT406	Systems Software	100	50	061	APR 2004
04	97CT407	RDBMS Lab (X Base, Oracle)	100	50	072	APR 2004
04	97CT408	Systems Software Lab	100	50	096	APR 2004
05	97CT501	Computer Networks	100	50	063	NOV 2004
05	97CT502	Unix & Network Operating Systems	100	50	062	NOV 2004
05	97CT503	PC Testing & Trouble Shooting	100	50	072	NOV 2004
05	97CT504	Software Engineering	100	50	063	NOV 2004
05	97CTE01	E - Commerce	100	50	064	NOV 2004
05	97CTE04	Client Server Computing & Visual C++	100	50	071	NOV 2004
05	97CT507	Object Oriented Programming Lab (C++)	100	50	088	NOV 2004
05	97CT508	PC Testing & Trouble Shooting Lab	100	50	083	NOV 2004
06	97CT601	Windows Programming	100	50	057	APR 2005
06	97CT602	Computer Graphics	100	50	069	APR 2005
06	97CTE08	Internet and Java Programming	100	50	066	APR 2005
06	97CTE10	Web Technology	100	50	065	APR 2005
06	97CT605	Elective Lab - III	100	50	093	APR 2005
06	97CT606	PROJECT	200	100	186	APR 2005

End of Statement

* Annual Pattern

Classification : FIRST CLASS

Total Marks : 2867 / 4100

Percentage (rounded to nearest integer) :   70

Medium of Instruction : ENGLISH

Chennai - 600 025.

Date : 08/09/2005

Controller of Examinations

ANNA UNIVERSITY
CHENNAI
M.C.A. DEGREE EXAMINATIONS

CONSOLIDATED STATEMENT OF MARKS

NAME OF THE CANDIDATE	RAVICHANDRAN B			REGISTER NO.	60705621037
COLLEGE OF STUDY	607: K.S.Rangasamy College of Technology			MONTH & YEAR OF LAST APPEARANCE	June 2008
PROGRAMME & SPECIALIZATION	M.C.A.			REGULATIONS	2005

SEM.	SUBJECT CODE	SUBJECT TITLE	MAX	MIN	MARKS SECURED	MONTH & YEAR OF PASSING
01	MC1601	Computer Organization	100	50	060	NOV 2005
01	MC1602	Problem Solving and Programming	100	50	069	NOV 2005
01	MC1603	Business Processes	100	50	080	NOV 2005
01	MC1604	Data Structures	100	50	072	NOV 2005
01	MC1605	Accounting and Financial Management	100	50	061	NOV 2005
01	MC1606	Data Structures Lab	100	50	097	NOV 2005
01	MC1607	Programming Lab	100	50	097	NOV 2005
02	MC1651	Mathematical Foundations of Computer Science	100	50	064	JUN 2006
02	MC1652	Object Oriented Programming	100	50	073	JUN 2006
02	MC1653	Design and Analysis of Algorithms	100	50	075	JUN 2006
02	MC1654	Database Management Systems	100	50	097	JUN 2006
02	MC1655	Operating Systems	100	50	077	JUN 2006
02	MC1656	Object Oriented Programming Lab	100	50	098	JUN 2006
02	MC1657	DBMS Lab	100	50	092	JUN 2006
02	MC1658	Alogorithms Lab	100	50	094	JUN 2006
03	MC1701	Computer Networks	100	50	082	NOV 2006
03	MC1702	Microprocessors and its Applications	100	50	075	NOV 2006
03	MC1703	Software Engineering	100	50	075	NOV 2006
03	MC1704	Computer Graphics and Multimedia Systems	100	50	072	NOV 2006
03	MC1705	Internet Programming	100	50	086	NOV 2006
03	MC1706	Graphics and Multimedia Lab	100	50	097	NOV 2006
03	MC1707	Microprocessor Lab	100	50	095	NOV 2006
03	MC1708	Internet Programming Lab	100	50	098	NOV 2006
04	MC1751	UNIX and Network Programming	100	50	061	JUN 2007
04	MC1752	Resource Management Techniques	100	50	071	JUN 2007
04	MC1753	Object Oriented Analysis and Design	100	50	074	JUN 2007
04	MC1754	Middle-Ware Technologies	100	50	074	JUN 2007
04	MC1622	Electronic Commerce	100	50	073	JUN 2007
04	MC1755	Visual Programming Lab	100	50	096	JUN 2007
04	MC1756	Unix and Network Programming Lab	100	50	097	JUN 2007
04	MC1757	Middleware Lab	100	50	098	JUN 2007
05	MC1801	XML and Web Services	100	50	078	NOV 2007
05	MC1802	Software Project Management	100	50	081	NOV 2007
05	MC1627	Software Quality Management	100	50	071	NOV 2007
05	MC1630	Data Warehousing and Data Mining	100	50	080	NOV 2007
05	MC1633	Mobile Computing	100	50	074	NOV 2007
05	MC1803	XML and Web Services Lab	100	50	098	NOV 2007
05	MC1804	Software Development Lab	100	50	097	NOV 2007
06	MC1851	Project Work	400	200	396	JUN 2008

End of Statement

Classification : FIRST CLASS WITH DISTINCTION

Total Marks : 3505 / 4200

Percentage (rounded to nearest integer) : 83

1/23/2023

Re: Ravichandran Balashanmugam

To Whom It May Concern:

This letter is to verify that Ravichandran Balashanmugam was employed by Private National Mortgage Acceptance Company (Pennymac) as a Sr Applications Developer from November 22, 2021, to December 1, 2022. As a Human Resources representative of Pennymac, I have knowledge of Ravichandran's employment, including job duties during employment with Pennymac and records that reflect their work history.

As a Sr Applications Developer with Pennymac, Ravichandran Balashamugam was responsible for design and coding, designing database schema, and writing complex SQL functions, stored procedures, triggers, and views. Worked closely with line of business to solve various business problems, providing technical and architectural guidance to team members, code review for onsite and offshore team members, and collaborated with the development team regarding AWS EC2 instance issues. In addition, Ravichandran created highly secured Web APIs, worked on .NET core migration and upgrades, worked on complex modules and initiatives, and provided production and release support.

During Ravichandran's employment at Pennymac, Ravichandran demonstrated in-depth knowledge and experience in .NET 4.6, .NET Core, Entity Framework, Entity Framework Core, ASP.NET Web API, ASP.NET MVC, SQL Server 2018, TFS, GIT, Azure Pipeline, jQuery, JavaScript, Ajax, and AWS.

Please do not hesitate to contact me if you have any questions regarding Ravichandran Balashanmugam's employment with Pennymac.

Sincerely,

Shana Sagasta
Operations Manager, Talent Acquisition
Mobile: 623.330.8737
shana.sagasta@pennymac.com
PENNYMAC.COM

December 17, 2021

<u>To Whom It May Concern:</u>

This letter is to confirm that Mr. Ravichandran Balashanmugam was employed with Randstad Technologies, from October 18, 2019 through November 19, 2021 on a full-time basis in the position of Senior Software Developer.

Mr. Ravichandran Balashanmugam was responsible for the following duties for the full duration of his employment with Randstad:

- Be part of the Agile team and responsible for designing, developing Microsoft .net services for the Digital Adoption.
- Be responsible to build and test /services and deployment support during production release.
- Experienced in Salesforce Lightning Component, Apex, marketing cloud, .NET, ASP.net, Web Services, Jenkins, Bitbucket, MVC, JASON, XML, postman, SoapUI, JavaScript, and SQL Server.

Please feel free to contact us should you have any further questions.

Sincerely,

Erin Serverius
Operations Specialist

October 18, 2019

211 Quality Circle
College Station, TX 77845
Toll-Free (855) 789-4268
Phone (979) 691-7700
Fax (979) 691-7750
www.Cognizant.com

Re: Ravichandran Balashanmugam(363721)

TO WHOMEVER IT MAY CONCERN

This letter is to confirm the direct employment of **Mr. Ravichandran Balashanmugam (363721)** with the Cognizant family of companies worldwide, on a full time (35-40 hours per week) basis.

Internal Band Level	Start Date	End Date	Location
Associate	January 16, 2013	February 12, 2013	India
Associate - Projects	February 13, 2013	June 30, 2015	India
Sr. Associate - Projects	July 01, 2015	November 01, 2015	India
Sr. Associate - Projects	November 02, 2015	October 17, 2019	United States

At Cognizant, we employ an internal band level with an official grade description as specified in this letter; however, Cognizant Business Units have mapped this official grade description to that of functional job titles. Therefore, in addition to the band level/ grade description provided in this letter, the employee will have had an official functional job title which is not captured in this letter.

As Associate, Mr. Ravichandran Balashanmugam was responsible for identifying detailed technical gap analysis of major areas of the application that we have customized like data input screens, forms, data grids, user activity, events and customized functionality which deal with business processes and move it to the new web layer, Testing Web Services, Web API calls using Fiddler and Postman tools, perform Root Cause Analysis of application issues by writing queries, running performance test using LoadRunner and determine data related issues if any and solve for application bottlenecks.

As Associate Projects, Mr. Ravichandran Balashanmugam was responsible for working in C#, .NET Framework, Web Services, SQL server, REST API, Alfresco, Angular 2, typescript, AWS, POSTGRESS Snowflake and Empower to enhance and customize the product for banks use, customize the Loan Origination processes like Loan Coordinating, Underwriting, Closing, Pricing, Funding, using BKFSs Empower LOS, Empower Setup for the banks need, Design Secure REST APIs as backend services using OAUTH mechanism to perform and assist the overall loan application process from the banks website, implemented Single Sign On SSO, Create dashboards using Angular 2 and Firebase to assist business users with a view on number of loan applications, status and various stages the loan is in with a feature to upload documents.

As Sr. Associate Projects, Mr. Ravichandran Balashanmugam was responsible for deploying REST API and frontend code in AWS EC2 instance, created RDS instance in AWS console using cloud formation template, delivery of overall technical solution, design of business modules, functional components and user interfaces, work with product managers and business partners to identify business problem statements, use cases and translate them into user stories that conform to ATDD standards, support release deployments from an IT perspective during the monthly or biweekly releases, work with technical architects to ensure newly created REST APIs conform to the banks standard. He was building CICD pipelines using GitHub, Jenkins, build Splunk logs, dashboards for monitoring APIs. He was participating in Peer Code review and performance improvements in Code execution.

As Sr. Associate Projects, Mr. Ravichandran Balashanmugam was also responsible for involving in application design and Architectural sessions with project managers, business analysts and team members to analyze business requirements, involve in Application retrospective and process improvement

sessions. He was responsible for creating and deploying web applications using Angular 5, Typescript, ASP.NET MVC, ASP.NET Web API, WCF, jQuery, JavaScript, Node.js, PowerShell, Python, Entity Framework, PostgreSQL, Snowflake, SQL Server, AWS EC2, AWS ECS, AWS S3, AWS IAM Services. He was responsible to attend and handle SCRUM ceremonies such as Standup, Sprint Grooming, Sprint Planning, Sprint Demo, Sprint Retrospective. He was responsible to participate in business requirements discussion with Product Managers and Business Analyst and convert those requirements in to user stories in JIRA board.

Mr. Ravichandran Balashanmugam gained experience in the following:

- Programming languages frameworks and tools: C#, MVC, ASP.Net, ADO.Net, WCF, WebAPI, WinForms, LINQ, Entity Framework, JSON, Angular 2, Angular 5, Splunk, Postman, Fiddler, Jenkins, Spring boot REST API, Python
- Scripting tools: jQuery, JavaScript, Node.js, Typescript, PowerShell
- Operating Systems: Windows XP, 2007,2010
- Database and Tools: SQL Server 2012, SQL Server 2016, Oracle, PostgreSQL, Snowflake, SSIS
- Cloud technologies: AWS EC2, S3, RDS, Cloud formation Template
- Agile Tools: Version One, Jira
- Version Control Tools: GitHub, VSTFS, TortoiseSVN

Sincerely,
For **Cognizant Technology Solutions U.S. Corporation**

Nivia Taboas
HR Representative
October 18, 2019

June 3, 2011

RAVICHANDRAN.B
19-12-A-26, Periyannan Gounder Nagar,
Cauvery Nagar, Mettur Dam-1,
Dist – Salem- Tamilnadu Pin Code- 636401

Dear Mr.RAVICHANDRAN. B

Sub: Exit Clearence / Experience Certificate

This is with reference to your resignation letter dated April 22, 2011

You are being relieved from the services of the company effective close of business hours today – June 3, 2011.

You have worked as ".Net Programmer" in the company from January 11, 2010 to June 3, 2011and your performance during this period was good.

As .NET Programmer of Cyberindigo Net Pvt Ltd, Mr. Ravichandran was responsible for Analysis, Coding and Unit Testing of the application, involved in deployment activities, created database design, Created Technical design document, involved in Software Configuration Management activities, provided support for DNN applications and web applications, developed and maintained numerous complex stored procedures and triggers, involved in requirement gathering, involved in project migration activities, addressed technical issues of the reporting team members and helped them to fix it, Bug hunting & fixing, developed efficient customer solutions, web pages designed and developed solutions to meet customer needs, created cascading style sheets, created many user controls(chart control, graph control, calendar control)

Mr. Ravichandran gained experience in .NET Programming Language, DotNetNuke, Classic ASP, JavaScript, JQuery, SQL Server and SCORM packages.

Full and final settlement of all your dues will be processed by the payroll department.

We wish you all the very best in your future endeavors.

Regards and best wishes

For Cyberindigo Net Pvt. Ltd.,

Authorised Signatory

April 20, 2017

To Whom It May Concern:

This letter is to confirm the work experience of Mr. **Ravichandran B** (Emp ID: 21625) for **Hexaware Technologies Ltd.**

Mr. Ravichandran B held the full-time position of Software Engineer for Hexaware Technologies Ltd from June 20, 2011 to Jan 11, 2013)

As Software Engineer of Hexaware Technologies Ltd, Mr. Ravichandran B was responsible for: Analysis, Design, Coding and Unit Testing, Developed Cascading Style Sheets (CSS), Developed user/performance evaluation documents for the end user's, created high level design document for requirement gathering and for better understanding of the project, provided production support, created XSLT for applying styles to the report which generated by using OpenXML, resolved many technical issues, provided knowledge transfer to the new team members, involved in designing database and created complex stored procedures, views, learned and implemented new technologies in a very short span of time.

Mr. Ravichandran B gained experience in .NET Programming Language, Entity framework, ASP.NET MVC, JQuery, Single page application, JavaScript and SQL Server.

This letter is issued for the purpose of applying for GC application.

Sincerely,
For **HEXAWARE TECHNOLOGIES LTD**.

Jacob P.U.
Associate Vice President- HR
April 20, 2017

Hexaware Technologies Ltd., (Unit - II), Plot No. H5, SIPCOT Information Technology Park, Navallur Post, Siruseri - 603 103. Kanchipuram Dt. Tel.: +91-44-4745 1000 Fax: +91-44-4745 111

Regd. office : #152, Millennium Business Park, Sector -3, TTC Industrial Area, Mahape, Navi Mumbai – 400 710, India. Tel.: 91-22-6791 9595   Fax: 91-22-6791 9500

आयकर विभाग
INCOME TAX DEPARTMENT

भारत सरकार
GOVT. OF INDIA

B RAVICHANDRAN

BALASHANMUGAM

21/02/1984

Permanent Account Number
AXJPR2425A

B. Ravichandran
Signature

23092010