Bhiman Kumar Baghel

SENIOR ENGINEER · M.Tech. Computer Science & Engineering

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Experience_

Samsung Research Institute

Bangalore, India

SENIOR ENGINEER, SPEECH RECOGNITION & NATURAL LANGUAGE PROCESSING - VOICE INTELLIGENCE R&D

June 2019 - Present

- Role: Research Work (Industry R&D) on Conversational AI, Natural Language Processing (NLP), Natural Language Understanding (NLU), Deep Learning and Machine Learning.
- Conversational AI: Worked on complex scenarios of Intent Classification, Slot-Tagging, Out-Of-Domain Detection, Domain classification, Dialogue Selection, and so on.

Achievements:

- 1. IEEE Access Journal: [PU1] Smart Stacking of Deep Learning Models for Granular Joint Intent-Slot Extraction for Multi-Intent SLU. Developed Stacking Ensemble of BERT, XLNet and ELMo for Token level Joint Multi-Intent and Slot Classification.
- 2. IEEE Access Journal: [PU2] Intent Focused Semantic Parsing and Zero-Shot learning for Out-Of-Domain Detection in Spoken Language understanding. Developed One-Class Neural Network (OC-NN) with intents as features for OOD detection.
- 3. [HA1] Patent The Next Generation SLU: Handling Missing Slots in Single & Multi-intent cases and in Open & Closed Domain scenarios, graded as A-grade by the company (filling ongoing).
- 4. Patent Cognitive Decline Based Wellness Management in Smart-Home via Multimodal Data Monitoring, graded as A-grade by the company (filling ongoing).
- Knowledge Representation: Knowledge Graph Construction, Dynamic Ontology, Dynamic Contextual Search System.
- NLP/NLU General: Automatic Question Answering from chat, Custom Named Entity Recognition.
- **Dataset Development:** Conceptualized and created new datasets, Supervised and collaborated in dataset creation, Analyzed shortcomings in existing datasets and synthesized their improvement policies.

Indian Institute Of Technology (IIT)

Kharagpur, India

TEACHING ASSISTANT - DBMS LAB

Jan 2019 - May 2019

TEACHING ASSISTANT - PROGRAMMING AND DATA STRUCTURE LAB

July 2018 - Nov 2018

• Lectures explaining concepts and relevant assignments. Evaluated regular lab assignments and tests.

IBM Bangalore, India

EXTREME BLUE INTERN - TEMPLATE BASED MACHINE LEARNING MODELS FOR MVS

May 2018 - July 2018

- Role: Deep learning & ML Intern
- Designed and developed a time series forecasting, self learning, deep learning system to predict then prevent or auto-resolve or assist to resolve failures in IT infrastructure. Developed a GUI for monitoring, action suggestion and feedback.
- Achievement: [HA2] 2nd Runner Up Audience Poll Category, IBM Extreme Blue Expo

Education

Indian Institute Of Technology (IIT)

Kharagpur, India

M.Tech. IN Computer Science & Engineering [CGPA - 8.82/10]

2017 - 2019

National institute Of Technology (NIT)

Jalandhar, India

B.Tech. In Computer Science & Engineering [CGPA - 6.82/10]

2013 - 2017

Publications

Smart Stacking of Deep Learning Models for Granular Joint Intent-Slot Extraction for Multi-Intent SLU

IEEE Access (Volume: 9)

[PU1] JOURNAL

07 July 2021

• N. Kumar and B. K. Baghel, "Smart Stacking of Deep Learning Models for Granular Joint Intent-Slot Extraction for Multi-Intent SLU," in IEEE Access, vol. 9, pp. 97582-97590, 2021, doi: 10.1109/ACCESS.2021.3095416.

Intent Focused Semantic Parsing and zero-shot Learning for Out-of-Domain detection in Spoken Language Understanding

IEEE Access (Volume: 9)

[DII2] IOURNAL

07 December 2021

• N. Kumar and B. K. Baghel, "Intent Focused Semantic Parsing and Zero-Shot Learning for Out-of-Domain Detection in Spoken Language Understanding," in IEEE Access, vol. 9, pp. 165786-165794, 2021, doi: 10.1109/ACCESS.2021.3133657.

Patents.

The Next Generation SLU: Handling Missing Slots in Single & Multi-intent cases and in Open & Closed Domain scenarios

SRI, Bangalore

Dr Niraj Kumar and Bhiman Kumar Baghel - Filling Ongoing

Cognitive Decline Based Wellness Management in Smart-Home via Multi-modal Data Monitoring

SRI, Bangalore

Dr Niraj Kumar and Bhiman Kumar Baghel - Filling Ongoing

Projects

DCLL: A Deep Learning Model For Simultaneous Travel Time Estimation and Traffic Congestion Prediction

M.Tech. Thesis Project

DEEP LEARNING, SUMO-SIMULATION OF URBAN MOBILITY

IIT Kharagpur

- Designed and developed a multi-tasking deep learning framework capable of simultaneous travel time estimation and traffic congestion level
 prediction (high, medium, low) on spatio-temporal data and new loss function (MSECE) to explicitly check the correctness of both the tasks
 simultaneously.
- Resulted in performance improvement by reducing MSECE by 70%, MSE by 59% and MAE by 48% than the baseline.
- Planned and generated traffic data using SUMO from scratch.
- Experimented and concluded 60s to 180s as best data collection sampling rates.

Automatic Concept Map generation from text-based Learning Material

Term Project

NLP, STANFORD CORENLP, SPOTLIGHT, STANFORD OPENIE, PYGRAPHVIZ

IIT Kharagpur

- Developed a system which, given textual information about some concept, identifies important sub-concepts, extracts relations between them, determine weights of these relations and present a visual representation in form of concept map.
- Assembled Stanford CoreNLP, Spotlight and Stanford OpenIE for co-reference resolution, important concept identification and relation extraction respectively to build a system which takes textual information as input and generates a concept map as output which is visualized by pygraphviz.

ASIP_MAX_MIN_AVG

Term Project

EMBEDDED SYSTEM, VERILOG

IIT Kharagpur

- Designed and developed an 8-bit ASIP (Appplication Specific Instruction-Set Processor) which calculates MAX, MIN and AVG of provided 'n' numbers
- Implemented control unit, arithmetic logic unit, memory unit, registers and control logic to perform the calculation using these components.

Twitter Sentiment Analysis

B.Tech. Final Year Project

MACHINE LEARNING, WEB DEVELOPMENT

NIT Jalandhar

- Developed website for real time sentiment analysis (positive, negative and neutral) (Naive Bayes algorithm) on four major categories i.e. People, Movie, Mobile and Place.
- User has choice to navigate already curated sentiment analysis or conduct his own and compare between two entities of same category.

Honors & Awards

| 2022 | MBO Bonus , Special bonus for High performance in Y2021. | SRI, Bangalore |
|------|--|----------------|
| 2021 | Spot Award , Excellent contribution in work (thrice). | SRI, Bangalore |
| 2021 | [HA1] Appreciation, Excellent contribution in 'A' grade (by SR HQ) patent (filling ongoing). | SRI, Bangalore |
| 2021 | MBO Bonus , Special bonus for High performance in Y2020. | SRI, Bangalore |
| 2020 | Winner, Clean Code Culture Award. | SRI, Bangalore |
| 2019 | Star of the Month , for best monthly performance among group members (twice). | SRI, Bangalore |
| 2018 | [HA2] 2nd Runner Up - Audience Poll Category, IBM Extreme Blue Expo. | IBM, Bangalore |
| 2015 | 2nd Position , Website Development Competition, Tech fest. | NITJ, India |

Skills

Specialization Machine Learning Engineering for Production (MLOps)

Programming Python, C/C++, JavaScript, LaTeX, Verilog

Deep Learning Keras, Tensorflow, Pytorch

Graph DB Neo4j

Web Flask, Django, HTML5, CSS

AUGUST 5, 2022 BHIMAN KUMAR BAGHEL · CV