

# Abhay Kumar

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## About Me:

Passionate and accomplished Machine Learning Professional with 10+ years of hands-on expertise in designing and implementing advanced Computer Vision, Natural Language Processing systems. Proven track record of leading teams, engaging with clients, and contributing impactful research to the field. A dedicated individual with a passion for innovation and a drive to deliver cutting-edge solutions.

## Objective

With my extensive experience, I am well-equipped and prepared to take on roles, in the field of Machine Learning, where I can drive impactful innovation, mentor talent, and contribute to organizational excellence and growth.

## Professional Experience:

### Machine Learning Lead - Target Corporation (Feb 2021 – Present)

- Collaborate cross-functionally with product managers, software engineers, and other stakeholders to understand business needs and devise solutions that align with strategic objectives.
- Conduct research to identify new state-of-the-art deep learning-based computer vision approaches, algorithms, and methodologies.

#### Anomaly Detection System for Data Pipeline

- Developed an anomaly detection system to prevent corrupt images from entering the data pipeline.
- Identified and blocked 30% of anomalous images, resulting in substantial reductions in processing time
- Improved downstream algorithms, leading to an 8% enhancement in business metric.

#### Invoice Digitisation System

- Implemented OCR model fine-tuning to detect and recognise specific style of text used in invoices.
- Finetuned transformer based layout analysis model to locate table areas for text extraction.
- Finetuned table transformer architecture and identified and reconstructed tabular structures.
- Digitized table data into structured JSON format, preserving row and column information as keys.
- Extracted key attributes from invoices for image indexing and efficient searching.

#### Privacy Blur Feature Implementation

- Developed a privacy blur feature for archived video streams.
  - Employed lightweight linear object tracking(kalman Filter) and yolo object detectors to reduce compute needs.
- Mentored junior team members, fostering their growth and enhancing the overall team's performance.

### Senior Data Scientist - Embibe (May 2019 – Jan 2021)

#### Question Tagging and Topic Extraction System

- Collaborated with SME, Data engineers and annotator team to gather and curate high-quality datasets for training and validation purposes.
- Designed and implemented an automated system to tag questions with subjects and extract relevant topics from text.
- Fine tuned Resnet based architecture for visual feature extraction and used BERT model for text embeddings extraction
- Enhanced content organization and searchability in a repository of millions of question papers.
- Utilized natural language processing techniques for precise content discovery.
- Developed question tagging using both text and image content, enabling better content recommendation and search accuracy.

#### In-House Annotation Tool Design

- Spearheaded the development of a custom in-house annotation tool, incorporating user and project management workflows.
- Collaborated closely with Subject-Matter Experts (SME) and annotators to gather requirements, ensuring that user needs were at the forefront of the tool's design.
- Integrated active learning capabilities into the system, enabling it to learn from initial observations evolve the annotation flow into an audit flow, where system-generated annotations were verified by annotators, leading to the rapid annotation of thousands of images with a small annotator team.

### Senior Data Scientist - ClipIndia (Sep 2018 – Apr 2019)

- Implemented NSFW video classification for Content Moderation, maintaining a clean platform by automatically detecting obscene content, leading to a 28% reduction in inappropriate content.
- Designed a video asset tagging system with multiple attributes, improving content discoverability and feed ranking, resulting in a 3% increase in DAU.

## Senior Data Scientist - Cogknit Semantics (Sep 2015 – Sep 2018)

### catalogue filtration project

- Spearheaded the catalogue filtration project, ensuring accurate product categorization on the .com website, resulting in a 12% reduction in incorrect product placements.
- Collaborated directly with clients to understand their specific business requirements and challenges that could be addressed through our Machine Learning capabilities.
- Played a key role in project planning and estimation, ensuring alignment with client expectations, and optimizing resource allocation.
- Led a high-performing team, taking responsibility for collecting client requirements, translating them into technical specifications, and effectively communicating these requirements to the team.
- Orchestrated end-to-end solution development, including data collection, preprocessing, model development, testing, and deployment, to meet client objectives and project timelines.
- Successfully delivered customized Machine Learning solutions, exceeding client expectations and achieving project milestones.

## Sr. Research Analyst - Edureka (Dec 2013 – Sep 2015)

- Served as a Teaching Assistant (TA), providing invaluable support to students in solving complex technical problems and facilitating their learning experience.
  - Recognized as the "Best Performer" for five consecutive months for outstanding contributions to student success and engagement.
- Contributed significantly to the community by authoring blog posts on advanced Machine Learning and Big Data topics.
  - Five of my blog posts became the highest-traffic generators on the platform.

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## Education:

- Bachelor in Computer Science, Visvesvaraya Technological University (VTU), 2013.

## Skills:

- Computer Vision: Object Detection, Image Classification, Text Detection, Text recognition, Segmentation
- NLP: Text Classification, Topic Modeling.
- Deep Learning : convolutional neural networks (CNNs), Transformers, ViT
- Frameworks: Deep Learning (PyTorch, TensorFlow), Scikit-learn.
- Data Processing: NumPy, Pandas, Spark, Hadoop.
- Software Engineering: Git, Docker, CI/CD.

## Publications and Presentations:

- Poster presentation on "Domain Adaptation of Image Caption Model for Video Descriptions" at AI & Deep Learning Conference (GTC 2018, NVIDIA).