

Analyzing online job portal data for the ICT sector in Bangladesh: what can we infer?

Prof. M. Sohel Rahman

CSE, BUET, Bangladesh

Fellow, Bangladesh Academy of Sciences



ACM Distinguished Speaker



IEEE CS Distinguished Speaker

REGIONAL HIGHER EDUCATION FORUM

Higher Education of the Future:

Leading Digital and Green Transformations through Collaboration

10–12 May 2023, Bangkok, Thailand



WHY



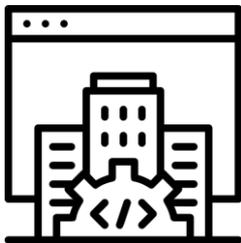
WHAT



HOW



WHY



4.5K Software Firm



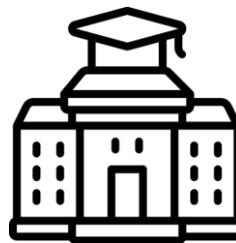
300K+ ICT Professionals



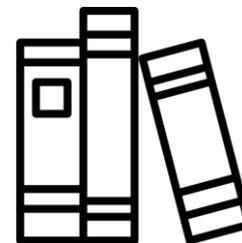
10K+ IT Graduates



Average ICT Sector
Growth is 40%+ from
2015 -2020



HEIs don't necessarily
update curriculum
regularly



Develop ways to
assess Nation-wide ICT
Demand and Update
Curricula

WHY

2 Identified Needs:
N1 and N2

N1

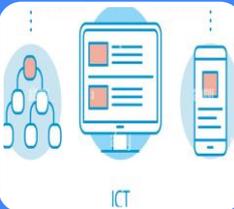


develop a methodology to assess nation-wide ICT skills demand

N2



Incorporate and leverage that assessment in the curricula update mechanism of the HEIs



The overarching goal is to cater for the ICT industry in Bangladesh.



WHAT

Research Questions



Can we analyze and infer the job demands?

(What job titles are in the highest demand?)



Can we identify the changing trends in terms of demand and supply of a particular job position?



Can the primary skills sought in the ICT sector be identified through an appropriate analysis?

How the answers of these question affect the CSE curricula?

HOW

Dataset

- Data from BDjobs.com
- job postings from January 1, 2016 to December 15, 2021
- 31,526 posts in total

Dataset



The largest job-matching site in Bangladesh



2.5 million registered jobseekers



25 thousand registered firms



200,000 visitors per day



40 million page views per month

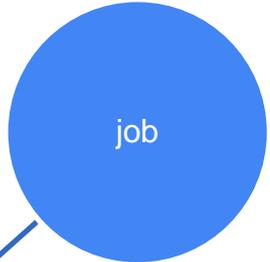
HOW

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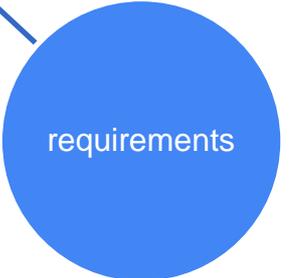
Dataset



Job Post



- Titles
- descriptions
- responsibilities
- locations,
- career levels,

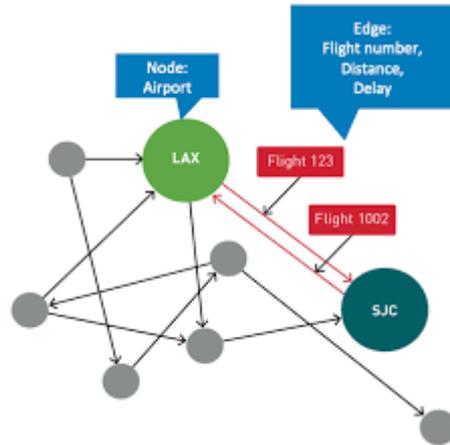


- age
- education
- sex
- years of experience.

HOW

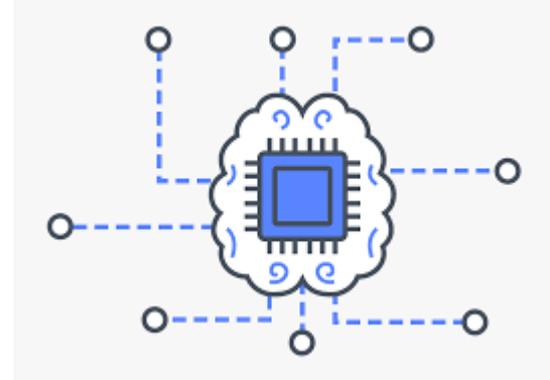


Statistical Analysis



Graphs and Visualization

Methodology



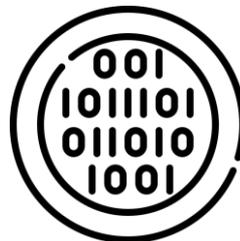
NLP Based Analysis

HOW

Methodology



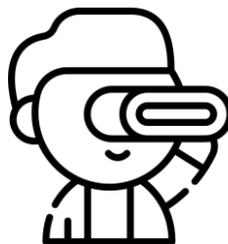
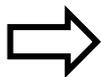
Job Description



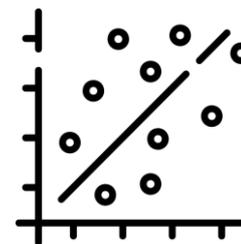
Tokenize & Train
Unigram, Bigram
& Trigram Model



Find the most
common Unigram,
Bigram & Trigram



Manually Inspect
for IT Skills



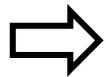
Further
Correlational
Analysis

HOW

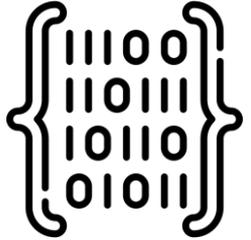
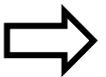
Methodology



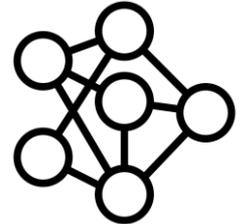
BDjobs Title



BERT based Transformer Architecture

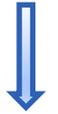


300D Vector



Cosine Similarity to map Bdjobs Title to ONET Title

~14K



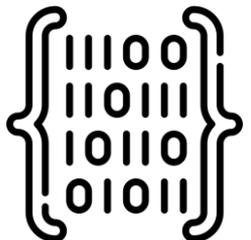
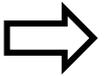
26



ONET Title



BERT based Transformer Architecture



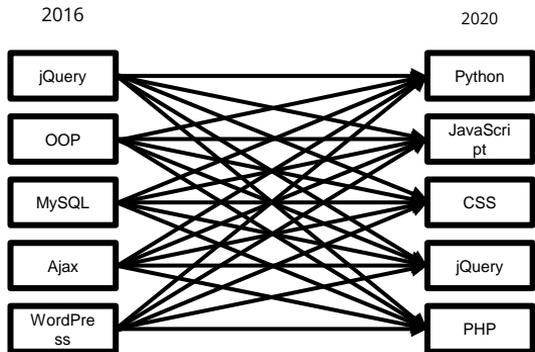
300D Vector



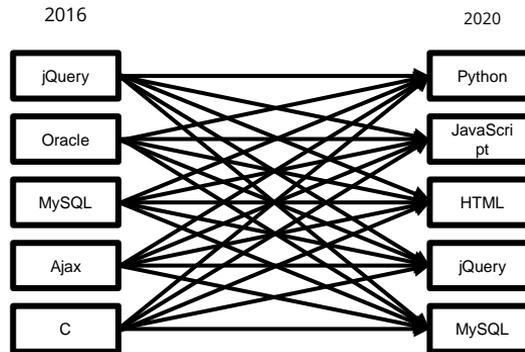


Methodology

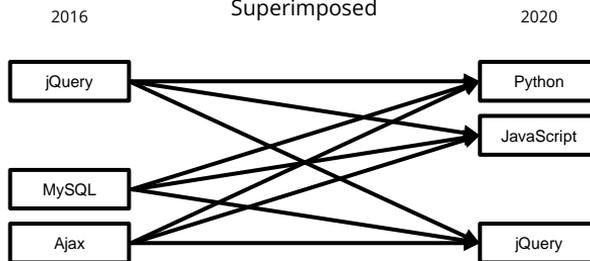
Company A



Company B



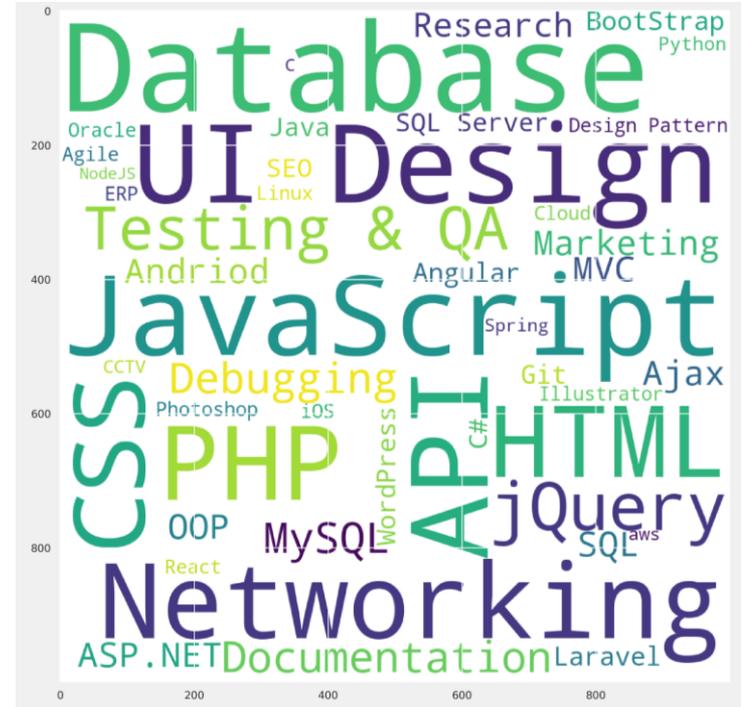
Superimposed



Significant Results



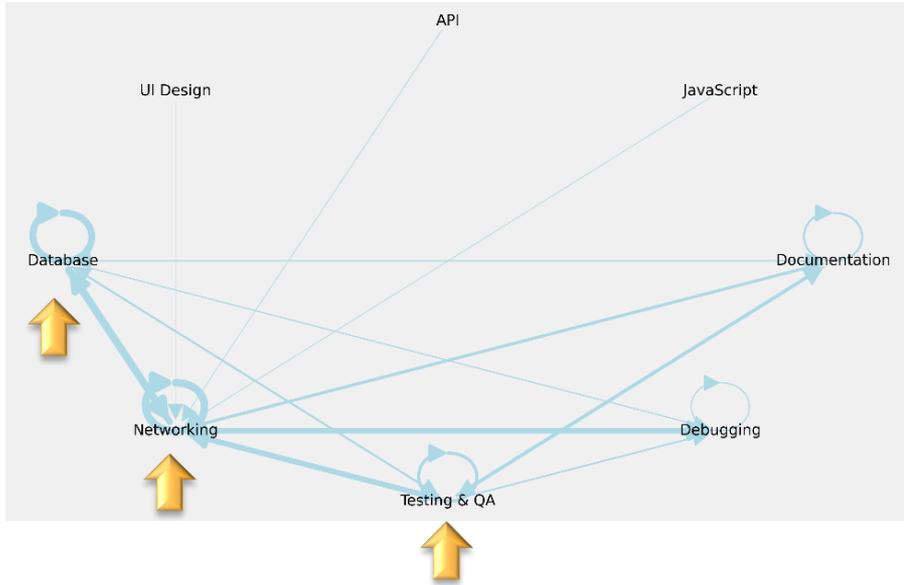
Word cloud of the frequency of O*NET job titles in data



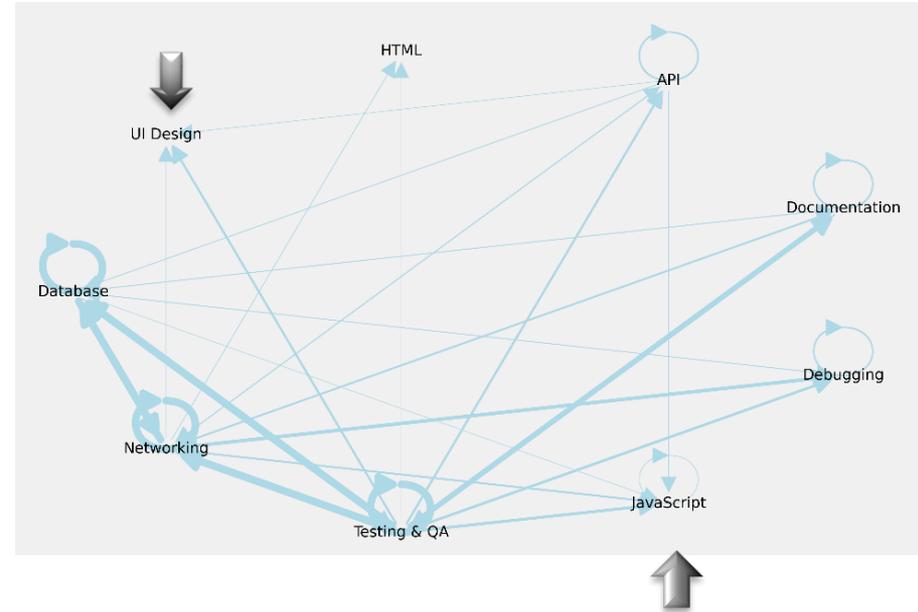
Word cloud of computer skills extracted from different job posts

Significant Results

2016-19 Skills shift Graph

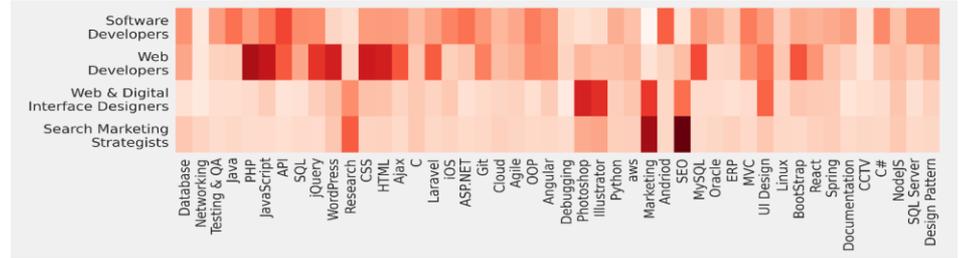
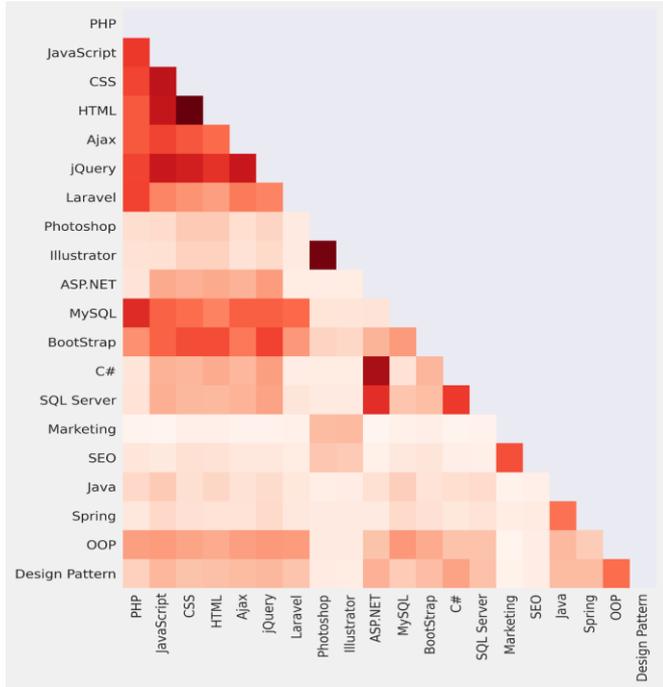


2019-21 Skills shift Graph



2016 -> 2019: moving towards Networking, Database and Testing & QA related services.
2019 -> 2021: more focus on JavaScript and UI Design with Networking, Testing and Database.

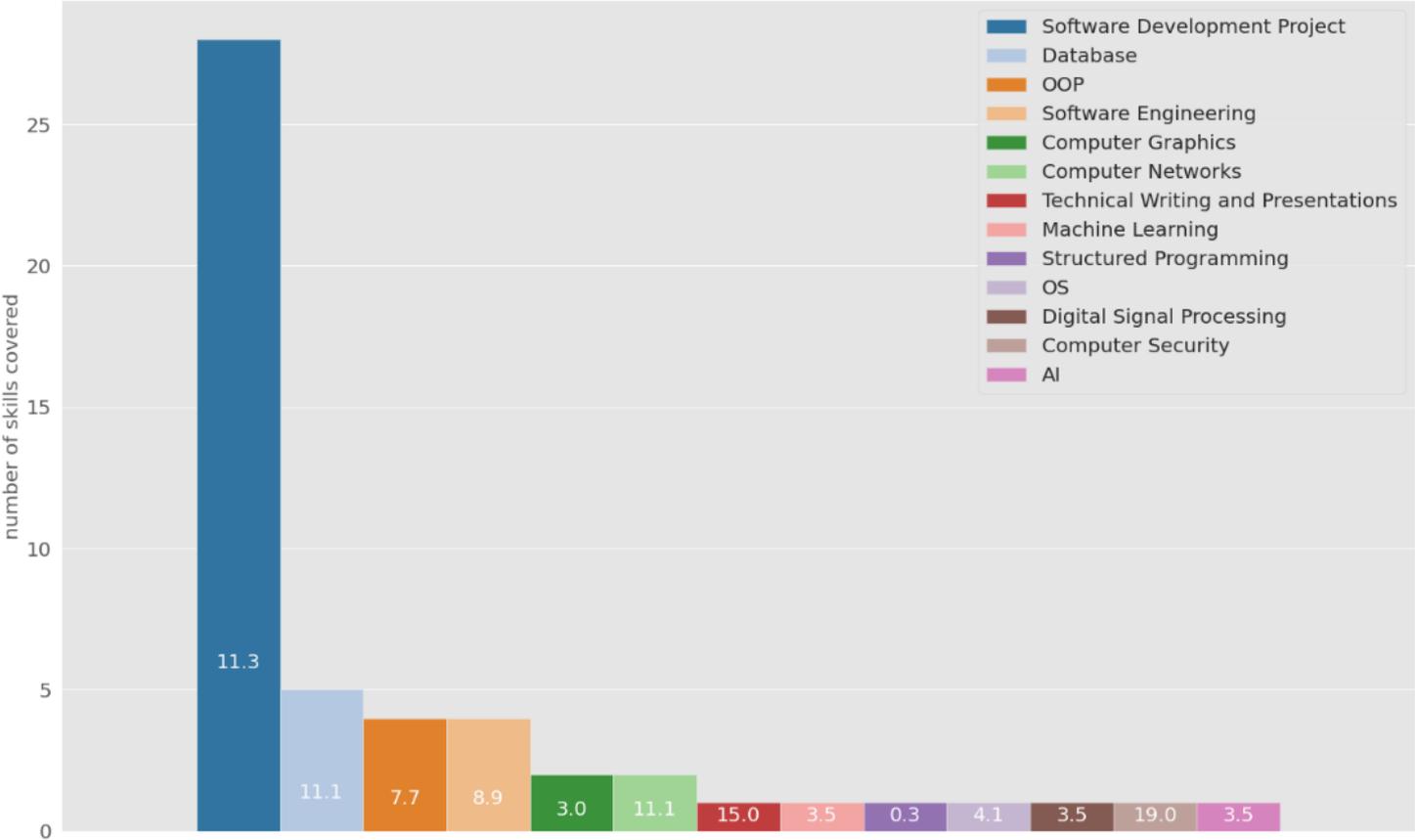
Significant Results



Correlation heatmap between skills and job titles

Correlation heatmap between ICT skills

Significant Results



Main Conclusions

①

While the high demand for Software Developers remained constant throughout the study period, an interesting trend is observed through the steady (and perhaps somewhat surprising) increase in the demand for Computer Systems Engineers/Architects.

②

Our analysis suggests that there are jobs with an apparent low demand that are receiving a lot of interest from the job seekers. One such striking example is the Network and Computer Systems Administrator (NCSA) post.

③

By collaborating with Bdjobs.com, it is recommended that BUET and other leading HEIs in Bangladesh regularly monitor the fast-changing IT industry skills demand through data analysis of online job postings to fine tune, revise and perhaps create new courses/programs, curricula and syllabi.

Remarks on the discord between Industry and Academia



- life long
- Independent

learning



- New tech.
- Emerging tech

Adaptability



- On one's own

Skills
Development



Acknowledgement



Article

An Exploratory Study of Online Job Portal Data of the ICT Sector in Bangladesh: Analysis, Recommendations and Preliminary Implications for ICT Curriculum Reform

Sheikh Saifur Rahman Jony ¹, Tsuyoshi Kano ², Ryotaro Hayashi ^{3,*}, Norihiko Matsuda ⁴ and M. Sohel Rahman ^{1,*}

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ASIAN DEVELOPMENT BANK

Looking Beyond:

Three characteristics of Tertiary Learning
in 2040

Micromasters
and nano
degrees

Ubiquitous
individualized
learning

(international)
(virtual)
learning groups

Will traditional University
programs be replaced (by
online/offline shorter programs)?



XYZ bagged a job of a school teacher for Bengali subject when Tagore gave a certificate: "My XYZ knows Bengali well"

