

# (MSRF) MICROSOFT RESEARCH FELLOWSHIP

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## Post Interviews:

Post the interviews [25th April] of the first round, I mailed Ravi regarding the updates on my application after 2-3 weeks [16th May]. As he had told wrt time it would take him to interview other candidates as well.

After having been rejected from the ANNS project, I still had some hopes for Suresh for the Applied ML role. As a recap, this was what was being asked earlier:

### 25th April 2023 - Suresh

It was a complete coding round. he was looking for me in his applied ml role. I wish this was done earlier and as primary project selection. It had like 2 programming questions in 1hr where I explain the initial idea then work out the optimization and code the whole thing. First was to find number of  $i, j$  pairs where “and” operation gives larger value than “xor” operation of numbers. I came from  $O(n^2)$  to  $O(n)$  complexity. Then there came question on finding the min column value of row sorted binary matrix where i went from  $O(n*m)$  to  $O(m*\log n)$  however it could be reduced further which I couldn't tackle. He then asked me if I had any questions and wrapped up the meet. |

He mailed back the same day tagging 3 other researchers, saying that there would be more interviews and more applicants he had to look into. They individually booked timings to take the interviews. As scheduled:

Suresh Parthasarathy	2-3 pm	25th April
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Arun Iyer	6:30-7:30 pm	18th May
Aditya Kanade	12-1 pm	19th May
Vaagesh DC	6:30-7:30 pm	19th May

## 18th May 2023 - Arun

The interview started with my introduction. As I mentioned my interest in the field of Data Science, he asked me to explain my work regarding that. I briefed him on my work at Mphasis. Till here things were great. He then looked at my resume and asked me to explain any project that I feel most proud about. I started with the server-side... project which was published in AAAI. The problem was when I was unable to communicate my thoughts to him causing a confusion that did not stand well.

He then shared a Google doc and asked me to write the logistic regression loss function and pseudo-code for gradient descent. He shared the link for coding Python from scratch for logistic regression. Once I was done big thing was that weights had an increasing norm for which he asked me to inculcate regularization within the code. He also asked how to check for hyper tuning the learning rate and another regularization parameter (grid search cv).

He then asked me questions for which I asked about the project and an overview of what's next in other interviews, with suggestions to prepare. These were:

AI for code: code synthesis and debugging

For example, Xbox: 200 repo, numpy: lib change

Prompt text-> automate

Suggestions for others' preparation

## 19th May 2023 - Aditya

Suggestions from the prev interviewer: Coding, ml, project

It went terribly! Need hands-on programming practice-which was just bad timing for me

I prepared thoroughly and tensed a lot about the interview. It started with an introduction. He shared a doc and asked about the mathematical formula for cnn and code from scratch in Python with for loops. I was able to make him understand my knowledge and understanding but I mixed up a lot while coding it out.

He then went to a coding question where for an undirected graph, we need to find if a path exists from source to destination. To which I replied by DFS. However again while coding in Python something went wrong with the return statement.

## 19th May 2023 - Vaagesh

Suggestions from the prev interviewer: Project, DSA-algo, ml

He started straight with a DSA algorithm question in C++ language. It was to tokenize string input. For example `__id_name-> [id name]`, `__col-> [col]`, `idName-> [id Name]`, `carModel-> [car Model]`, `Date_of_birth-> [Date of birth]`, `PERSONAL_AGE-> [PERSONAL AGE]`. I came up with the formula for splitting tokens on non-alphabet characters and small to upper case change.

He then asked to incorporate what there was no case change like `idcard-> id card`, then I asked if dictionary. I incorporated checking the token in the dictionary and appending it.

Changed for like what if there multi ways like `satinbrand-> satin brand, sa tin brand` (It was homework to be sent by Sunday afternoon). However, I sent that on Saturday evening. I used a ranking dictionary, wrt how common the words are.

He then went to the ML question with a Table where we need to predict the classification of columns (relevant to animals). It was an oral question, we brainstormed on classification and concluded by averaging the embedding.

Future directions:

Learn about prompt engineering

Hands-on experiment with CHATGPT on code debug

Explore codebert