Regulated Research Institutional/Industrial Setting Form (1C)

This form must be completed AFTER experimentation by the adult supervising the student research conducted in a regulated research institution, industrial setting or any work site other than home, school or field.

Student's Name(s)   Rohan Nagavardhan

Title of Project   Identifying Exoplanet Companions using Radial Velocity Data with Deep Learning

To be completed by the Supervising Adult in the Setting (NOT the Student(s)) after experimentation:
(Responses must be on the form as it is required to be displayed at student's project booth; please do not print double-sided.)

The student(s) conducted research at my work site:
1. Did you or your proxy (e.g. graduate student, postdoc, employee) mentor or provide
   substantial guidance to the student researcher?   ☑ Yes   ☐ No
   a. If no, describe your and/or your institution's role with the student researcher and
      his/her project (e.g. supervised use of equipment on site without ongoing mentorship
      and sign below.

   b. If yes, complete questions 2 –5.

2. Is the student's research project a subset of your ongoing research or work?   ☐ Yes   ☑ No
   Use questions 3, 4 and 5 to detail how the student's project was similar and/or
   different from ongoing research or work at your site.

3. Describe the independence and creativity with which the student:
   a. developed the hypotheses or engineering goals for the research project

      This project was picked by the student himself. He picked
      this topic because of his own interest in exploring
      exoplanets.

   b. designed the methodology for his/her research project

      After choosing this topic, the student did a reasonable
      literature survey. Based on the survey, he designed the
      methodology and collected the relevant data for the
      project.

   c. analyzed and interpreted data

      After the data collection, he modelled his interpretation
      and analysis. However, during the modelling where he
      had to use machine learning concepts, I offered his some
      guidance.

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Student's Name(s) Rohan Nagavardhan

4. Detail the student's role in conducting the research (e.g. data collection, specific procedures performed). Differentiate what the student observed and what the student actually did.

After the literature survey, student observed that AI and ML was a growing field in exoplanet detection, and he realized that astronomy data is publicly available. Further, he researched some unique exoplanet detection methods that had not been worked on through AI and a technique that had enough data to create something substantial. His project was entirely done by himself. There are no set procedures in a computer science project like this one; however, he designed the overall solution architecture based on his findings during the literature review. The data collection was done by himself and he retrieved all necessary data from the NASA Exoplanet Archive. Additionally, he sifted through the data and made sure that the data files were not corrupted and had enough data on which analysis could be conducted. The student observed that some files lacked sufficient data, and as a result, he used simulation techniques found in the literature survey to find efficient ways to simulate radial velocity data efficiently. The analysis was done on AWS EC2 virtual machines for the boost in processing speeds, but the code was written by him. The student initially wanted to utilize neural networks for this research endeavour however, after analyzing the resulting data, he used a decision tree model that was trained on the data. After training the model, he collected the metrics needed to determine the strength of the model. He observed that the model performed well and he decided the necessary steps for the research project.

5. Did the student(s) work on the project as part of a group?   ☐ Yes   ☑ No
If yes, how many individuals were in the group and who were they (e.g. high school students, graduate students, faculty, professional researchers)?

I attest that the student has conducted the work as indicated above and that any required review and approval by institutional regulatory board (IRB/IACUC/IBC) has been obtained. Copies are attached if applicable.
I further acknowledge that the student will be presenting this work publicly in competition and I have communicated with the student research regarding any requirements for my review and/or restrictions of what is publicized.

Praveen Tripathi		Research Assistant Professor
Supervising Adult's Printed Name	Signature	Title
Stony Brook University		11/02/19
Institution		Date Signed (must be after experimentation) (mm/dd/yy)
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