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14.09.2021

## **Letter of Reference for Pavan Bhat Keelanje Srinivas**

To whom it may concern,

It is our pleasure to recommend Mr. Pavan Bhat Keelanje Srinivas for a position related to data science or data analysis.

Mr. Bhat Keelanje Srinivas has been an intern at TRUMPF Werkzeugmaschinen GmbH + Co. KG from March 2021 to September 2021. We have been supervising his work during the whole period, and we met frequently to assign tasks and discuss results and further actions.

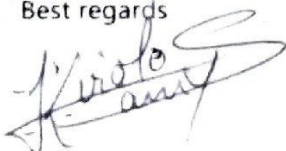
Mr. Bhat Keelanje Srinivas was working on assembling a training data set for a deep learning task. For this, he created a software module that selects parts, to be cut from a metal sheet, from a larger set of parts and nest them into a layout. The nesting algorithm was hosted in a Microservice in the cloud. As a part of his work, Mr. Bhat Keelanje Srinivas has developed sophisticated geometric post-processing procedure to generate the relevant data.

In the time we have known him, Mr. Bhat Keelanje Srinivas has consistently been a strong employee. We would especially like to point out his ability to work independently and achieve outstanding results. He's self-motivated, attentive to detail, and skilled at both independent and collaborative work. Mr. Bhat Keelanje Srinivas also left a mark with his open personality. He is well spoken and succeeded in explaining difficult concepts to colleagues in detailed discussions. He has a well-organized mindset, and he is capable of breaking big problems into smaller ones, which was necessary for the task.

Mr. Bhat Keelanje Srinivas was very polite and helpful towards other employees. He was also subtle in representing the methodologies and results in weekly reports through graphs, diagrams and documentation.

We highly recommend Pavan as an employee at your company. Having quickly become a valued member of the team at TRUMPF, we are confident that he has a successful career ahead of him. Please do not hesitate to contact any of us if you have any further questions.

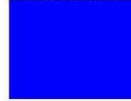
Best regards



Kirolos Abdou



Dr. Frederick Struckmeier

**TRUMPF****TRUMPF Werkzeugmaschinen GmbH + Co. KG**

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**Certificate**

<b>Name:</b> <i>Name</i>	Pavan Bhat Keelanje Srinivas
<b>Geburtsdatum:</b> <i>Date of Birth</i>	25.03.1994
<b>Tätigkeit:</b> <i>Type of Activity</i>	Internship
<b>Abteilung:</b> <i>Department</i>	R&D Production Platforms MT
<b>Einsatzzeitraum:</b> <i>Time Period</i>	01.04.2021 – 30.09.2021
<b>Aufgaben / Projekte:</b> <i>Assignments / Projects</i>	<ul style="list-style-type: none"> <li>▪ Literature survey in deep learning and introduction to pytorch/geometric tools</li> <li>▪ Feature engineering and Label design definitions for Computer aided manufacturing data</li> <li>▪ Development of automated nesting algorithm and adding features based on an API in cloud based microservice using C# and NET</li> <li>▪ Design thinking and ideation in creating novel vector representation concepts for geometric information</li> <li>▪ Automated Part Analytics procedure to breakdown geometry into systematic numerical information using C# and python, also involving some cross-functional coordination responsibilities</li> <li>▪ An automated quality evaluation and data cleaning procedure with computer vision using open CV and Python image processing framework</li> <li>▪ Development of object oriented program for converting nesting data into graph data structure using part detection methods to determine relational decision matrix of a nesting arrangement</li> <li>▪ An end to end automated data generation, cleaning, logging, debugging, CV based quality evaluation, PyDOE and surrogate based parameter sampling and data extraction framework</li> </ul>

Geschäftsführung:  
Dr. Stephan Mayer  
Dr.-Ing. Thomas Schneider  
Dipl.-Wirt. Ing. Till Küppers  
Marcella Montelatici

TRUMPF Werkzeugmaschinen GmbH + Co. KG, Sitz Ditzingen,  
Amtsgericht Stuttgart HRA 202772  
USt-Id-Nr. DE 813 103 015  
PhG TRUMPF Werkzeugmaschinen Beteiligungs-GmbH, Sitz Ditzingen,  
Amtsgericht Stuttgart HRB 206070

**Beurteilung**  
*Evaluation*


	entspricht nicht den Anforderungen <i>fails to meet requirements</i>	entspricht nur teilweise den Anforderungen <i>only partially satisfies requirements</i>	entspricht den Anforderungen in vollem Umfang <i>satisfies requirements</i>	übertrifft die Anforderungen <i>exceeds requirements</i>	übertrifft Anforderungen bei weitem <i>strongly exceeds requirements</i>
<b>Analytische Fähigkeit</b> <i>Analytical Ability</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
<b>Lernbereitschaft</b> <i>Eagerness to Learn</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
<b>Selbstständigkeit und Engagement</b> <i>Ability to Work Independently and to Show Dedication</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
<b>Zuverlässigkeit</b> <i>Reliability</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
<b>Gewissenhaftigkeit</b> <i>Conscientiousness</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
<b>Auffassungsgabe</b> <i>Comprehension</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
<b>Kommunikations- fähigkeit</b> <i>Communication Skills</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
<b>Persönliches Auftreten und Verhalten</b> <i>Personal Appearance and Behavior</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

<b>Freie Beurteilung</b> <i>Evaluator's Comment</i>	Mr. Bhat Keelanje Srinivas has a well-organized mindset and is able to break down large problems into smaller ones.
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<b>Fachliche Kenntnisse:</b> <i>Professional Knowledge</i>	<ul style="list-style-type: none"> <li>▪ C#,.NET</li> <li>▪ Python</li> <li>▪ OpenCV, python image processing tools</li> <li>▪ Pytorch/geometric tools</li> <li>▪ PyDOE,Python surrogate modelling tool box</li> </ul>
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We would like to thank Mr. Bhat Keelanje Srinivas for her commitment in our company and wish her all success for her further studies and personally all the best.

Ditzingen, 30 September 2021

DocuSigned by:  
  
F7B36C869EE54D1  
i. A. Dr.-Ing. Sabine Muschik  
Head of R&D Agile Mgmt Ecosystems MT

DocuSigned by:  
  
731C2DC2897246D  
i. A. Sanja Wenzel  
HR Direct