



WWW.LITTLECAESARS.COM

Pizza Quality Imaging: Making the Perfect Pizza Every Time

Two Sentence Elevator Story:

Help Little Caesars guarantee that every pizza is perfect. Students on the Little Caesars team will use computer vision to analyze pizzas as they are made to ensure they have all the right toppings and quantities and are baked to perfection.

Abstract:

Everyone loves eating pizza, and Little Caesars strives to provide the highest quality pizza every time. The students on this team will use video/image analysis to and use machine vision to compare a pizza in the process of being made to established quality standards. This could happen both prior to and after cooking. Students will create a system that provides a quality check for pizza before it goes in the oven and provides feedback to the employee if the pizza is what the customer ordered and up to the stringent Little Caesars standards.

Impact:

The pizza industry is a highly competitive one where pizza quality is important... Increased pizza quality improves customer satisfaction and impacts the bottom line with more sales. Additionally, early feedback of issues before a pizza goes in the oven can lead to decreased waste and more efficient kitchen operations, which results in more profitable restaurants.

Scope:

Minimum Viable Product Deliverable (Minimum level of success)

- A system with the ability to view an image of a pizza and quantify the characteristics that make it a high quality product including:
 - Crust type (round, thin-crust, deep-dish)
 - Which toppings are on the pizza and whether it is a standard menu item or a custom pizza
 - Topping quantities
 - Topping distribution
 - Presence of other defects in the make process including improper sheet-out (uncooked crust), improperly spread sauce, etc...

Expected Final Deliverable (Expected level of success)

- System with the ability to analyze an image of an uncooked pizza and produce an inventory of the pizza's attributes and any found defects.
- The ability to provide an alert to the employee with feedback on how the pizza deviates from quality standards or if the pizza is not the pizza requested by the customer.

Stretch Goal Opportunities (High level of success - May include one or more of the following)

- Ability to identify 'half-toppings'.
- Ability to assess an image of the cooked pizza and identify defects such as over/under bake and 'bubbles in the crust'.

Student Skills:

MDP Sponsored Projects are both a professional and academic learning experience for students. By participating in this program, students are actively preparing for graduate school and a professional career. As part of the experience, MDP expects professional behavior. To best prepare you for future professional opportunities, your experiences on this MDP team will be very broad. In addition to key technical skills that you will bring to the team, you will engage deeply in the self-directed learning of new and important concepts, demonstrate flexibility, collaboration, and cooperation, and develop strong professional communication skills. This also means that you will need to be able to work outside of your traditional area of study in the true multidisciplinary nature of our projects. You won't always be able to anticipate how your skills and expertise will be used, so the MDP Sponsored Project will challenge you to grow and develop as a professional.

Project Area	Specific Skills	Likely Majors
Optical Recognition (1-2 students)	Machine Vision	EE (MS/MSE) CS (MS/MSE)
Programming (3-4 Students)	General programming skills. Completion of EECS 281. Interest and motivation in developing MV skills. Android experience or the motivation to learn.	CS (All) Any
UI/UX (1)	Development of user experience for the employee.	SI (MS) ARTDES CS (All)

Additional Desired Skills/Knowledge/Experience

Any of the following Skills, Knowledge, Experience, Interest or Outlook, would be valuable to the 2020 team. We don't expect students to be familiar all or even most of the technical items, but strong candidates will have familiarity or experience with some of them and a positive attitude to learn what is necessary as the project gets underway. Please highlight your experience with any of the items on this list in your personal statement on the application.

- Computer Vision
- Cloud services for Computer Vision such as Microsoft Azure's Cognitive Services or Google Cloud's Vision AI
- Android programming, Java, Flutter
- Integration with REST services
- User Interface development for web or mobile
- Ability to work in store with employees to take photos of pizzas
- Interest in food preparation and love of pizza

Location:

Most project work will take place on campus, with opportunities for presentation and work-together time with the professional team at Little Caesars Headquarters in Detroit, MI (MDP will provide transportation).

Sponsor Mentor:



Tim Somero

Tim is a proven leader with broad and deep technical knowledge, business understanding, and experience in Retail and Marketing technology. His focus is on making the team and the company competitive through intelligent use of technology and agile development methods. He has a track record of leading software development teams to deliver solutions to complex business and technical challenges and has worked with numerous companies in various industries before joining the Little Caesars team.

Executive Mentors



Keith Faigin

Vice President of Digital

Keith and Bryan will be available as executive mentors. Keith is at Little Caesars where he oversees the online ordering platform including web, mobile including implementing ground breaking technologies such as Little Caesars Pizza Portal®.



Bryan Rayo
VP of Software Engineering

Brian is responsible for the architecture and technology teams responsible for all aspects of Little Caesars IT systems. Little Caesars is the easiest way to pizza in the United States and 22 other countries. Keith and Bryan are working to bring that experience into the digital world, as well.

Faculty Mentor:



Brent Griffin
Assistant Research Scientist, Electrical Engineering and Computer Science

Brent is passionate about pushing the boundaries of robotics. He enjoys learning and developing new methods. His academic research interests include perception, reasoning, and control on physical robot systems and applications of wireless power transfer.

Legal Requirements:

Citizenship Requirements.

- This project is open to all students on campus.

Intellectual Property Agreements / Non-Disclosure Agreement

- Students will sign IP/NDA document(s) that are unique to Little Caesars. Please see the link on our project page to review the document.

Summer Project Activities

- Students will be guaranteed an interview for a 2020 internships. The interviews will take place in December 2019.

Company Information:

We are a tech company that makes pizzas. Lots and lots of pizzas.

Anchored in the heart of the District Detroit (<http://www.districtdetroit.com>) there has never been a better time to join our team! Come join a growing company that values their colleagues and does so much to give back to the communities we do business in. Having fun and liking pizza is a bonus:) As the fastest growing pizza chain in the U.S., there's no denying that Little Caesars is doing something right.* We're an international brand that's a household name and a front-of-mind decision

when you've got pizza on the brain. We've grown tremendously since opening the first store in 1959 – and we're still growing. Our success as a big-town name is because of our focus on small town values.

* *Fastest growing pizza chain in the U.S. – based on net number of stores added each year 2008-2015.