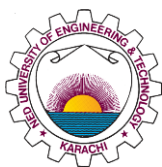


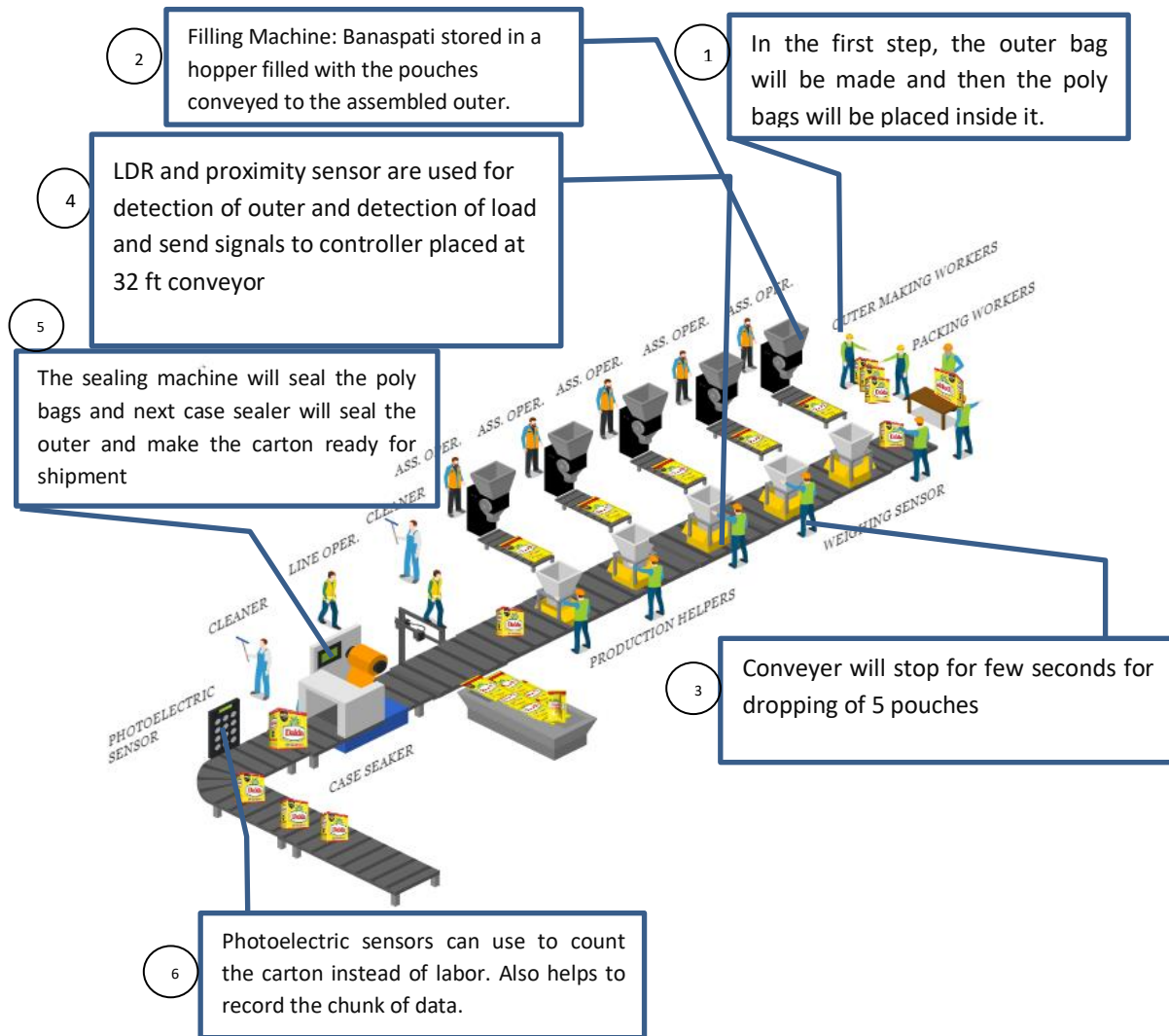
### Final Year Project Showcase Batch 2020 Year 2024

<b>Department: Industrial &amp; Manufacturing Engineering</b> Programme: <b>Industrial &amp; Manufacturing Engineering</b>	
<b>1</b>	<b>Project Title</b> An IoT based Intelligent Automated Production Line for Smart Manufacturing
<b>2</b>	<b>Project Idea</b> This project is related to automating the packing of banaspati oil pouches filling production line industrially collaborated with Dalda Foods Limited. By using an automated packaging system, utilizing the concept of Industry 4.0, bulk orders can be made less period of time with enhanced product & material movement while considering existing limitations. It reduces labor costs, processing time, and manual handling by Smart Manufacturing.
<b>3</b>	<b>Process</b> The project was implemented through several critical phases: <ol style="list-style-type: none"> <li>a. Analysis of current process and production line</li> <li>b. Data Gathering, real-time data analysis, and research for proposed idea</li> <li>c. Device, sensors, and components selection and integration</li> <li>d. System designing and modelling on Plant Simulation Software</li> <li>e. Validation, cost and reliability analysis of proposed system</li> </ol>
<b>4</b>	<b>Outcome</b> Dalda Foods has successfully optimized its production line by implementing an IoT system, resulting in a 21% increase in production efficiency. This improvement has also led to a 31% reduction in labor costs, decreasing the workforce from 26 to 18 workers by Smart Manufacturing. These well-trained laborers can be accommodated on other production floors as needed. The new system has streamlined operations, reducing stoppages and increasing productivity. Moreover, the overall efficiency has risen from 61% to 83%. By addressing bottlenecks, optimizing floor layout, and utilizing sensors, the company has achieved a more efficient, productive, and sustainable production line, setting new benchmarks for operational excellence.
<b>5</b>	<b>Evidence (Theoretical Basis)</b> To meet its demand, Dalda, a prominent name in the FMCG sector with high demand, is continuously working on production enhancement. The company aims to increase productivity in the most optimized manner. The current manual operation in the filling department presents several challenges, including inconsistencies, manual handling constraints, and decreased productivity due to the reliance on semi-automated systems. Drawing the research explores the concepts of automation, smart manufacturing, and the Internet of Things (IoT), highlighting their significance in optimizing production processes. Automation, ranging from basic to intelligent forms, streamlines tasks, enhances productivity and improves decision-making. Smart manufacturing integrates advanced technologies like IoT, AI, and data analytics to create intelligent, interconnected systems for real-time decision-making and adaptability. After the implementation of the IoT system, there is a significant production enhancement coupled with a reduction in the number of laborers and cost. The proposed automation of the oil filling production line holds the promise of streamlining operations, improving product quality, meeting the evolving needs of consumers, and achieving sustainable growth in a competitive market environment.
<b>6</b>	<b>Impact on Sustainability of Urban Regions or SDG-11 "Sustainable Cities and</b>

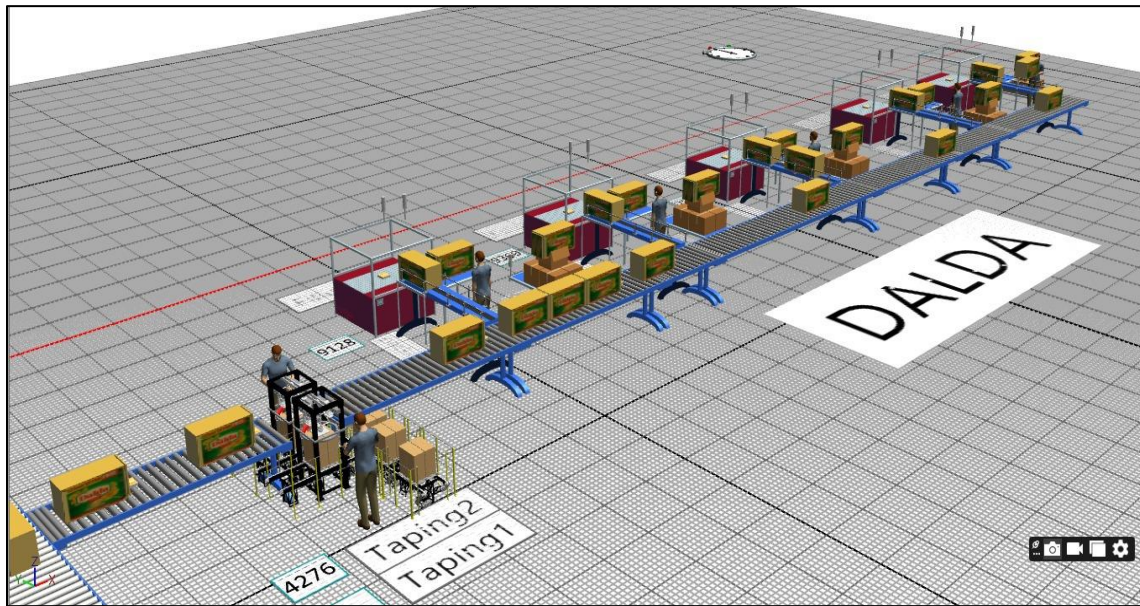


	<p><b>Communities”</b> The project contributes to SDG-11, "Sustainable Cities and Communities," by enhancing production processes and optimizing resource use to support more sustainable industrial operations. The automation system reduces energy consumption, optimizes resource use, and minimizes waste, all of which contribute to the long-term sustainability of urban regions.</p>
7	<p><b>Competitive Advantage or Unique Selling Proposition</b> (Cost Reduction, Process improvement, Attainment of any SDG (Sustainable Development Goal), increase of market share or capturing new market or having superior performance over a competitor. In summary, any striking aspect of the project that compels the industry to invest in FYP or purchase it. Some detailed description is required in terms of how, why when what. You can select one or more from the following dropdown and delete the rest of them). Please keep relevant options, delete the rest of them, and correct the sequence</p>
a	<p><b>Attainment of any SDG</b> (e.g. How it is achieved and why it is necessary for the region)  <b>SDG 8: Decent Work and Economic Growth</b></p> <ul style="list-style-type: none"> <li>• Boosts productivity and efficiency through IoT and automation.</li> <li>• Fosters skill development and enhances worker safety and working conditions.</li> </ul> <p><b>SDG 9: Industry, Innovation, and Infrastructure</b></p> <ul style="list-style-type: none"> <li>• Encourages industrial innovation through cutting-edge technologies.</li> <li>• Develops resilient infrastructure through real-time monitoring and predictive maintenance.</li> </ul> <p><b>SDG 12: Responsible Consumption and Production</b></p> <ul style="list-style-type: none"> <li>• Optimizes resource use and minimizes waste and promotes sustainable practices</li> <li>• Encourages sustainable industrialization through intelligent monitoring and control systems.</li> </ul>
b	<p><b>Environmental Aspect</b> (e.g. carbon reduction, energy-efficient, etc.) The IoT system reduces energy consumption by optimizing machine performance, lowering the factory's carbon footprint. Predictive maintenance and real-time monitoring minimize downtime and energy waste. Precise monitoring decreases material waste, promoting more sustainable operations.</p>
c	<p><b>Cost Reduction of Existing Product</b> Automation cuts labor costs by 31%, reducing the workforce from 26 to 18 while reallocating workers to other tasks. Predictive maintenance reduces breakdowns and repair costs. Precision in filling processes lowers raw material waste.</p>
d	<p><b>Process Improvement which Leads to Superior Product or Cost Reduction, Efficiency</b> <b>Improvement of the Whole Process</b> (e.g. What is the issue is current process and what improvement you suggests) The system introduces significant process improvements, such as reducing bottlenecks, minimizing manual labor errors, and increasing throughput. These improvements directly result in cost savings through reduced labor costs and energy consumption. The company also benefits from shortened lead times, allowing for quicker delivery of orders and increased customer satisfaction.</p>
e	<p><b>Expanding of Market share</b> (e.g. how it expand and what is the problem with the current market) In Pakistan, most industries have yet to adopt <b>Industry 4.0</b> practices, relying on outdated systems. This presents a significant opportunity for companies like Dalda by implementing this IoT-based smart manufacturing project, they can gain a fast-mover advantage in a market with increased production capacity, product quality, efficiency and capture more</p>

	market share by positioning themselves as leaders in technological innovation.	
f	<b>Capture New Market</b> (e.g. Niche market or unaddressed segment)	
	With the development of smart cities globally, there is a rising demand for infrastructure components like smart sensors, connected devices, and energy-efficient systems. Companies producing these high-tech components can benefit from automated, precise production lines.	
8	<b>Target Market</b> (Industries, Groups, Individuals, Families, Students, etc) Please provide some detail about the end-user of the product, process, or service)	
	Food and Beverages Industries, Automotive Industries, Pharmaceutical Industries, Cement Industries, Packaging Industries, Chemical and Petrochemical Industries, and Textile Industries.	
9	<b>Team Members</b> (Names along with email address)	Fatima Rafiq ( <a href="mailto:fatimarafiq4110@gmail.com">fatimarafiq4110@gmail.com</a> ) Sozain Shakeel ( <a href="mailto:sozainshakeel02@gmail.com">sozainshakeel02@gmail.com</a> ) Ayesha Rafiq ( <a href="mailto:rafiqayesha724@gmail.com">rafiqayesha724@gmail.com</a> ) Atqa Khurshid ( <a href="mailto:atqakhurshid@gmail.com">atqakhurshid@gmail.com</a> )
10	<b>Supervisor Name</b> (along with email address)	Muhammad Danish Saleem ( <a href="mailto:mdanishsaleem@cloud.neduet.edu.pk">mdanishsaleem@cloud.neduet.edu.pk</a> )
11	<b>Video (If any)</b>	<a href="https://shorturl.at/Q4Jjn">https://shorturl.at/Q4Jjn</a>



*Fig: Layout of Proposed Production System*



*Fig: Simulation Model of System on Plant Simulation Softwar*