Vitamin deficiency creates significant health risks worldwide. Early detection is crucial to prevent irreversible damage. There is a critical need for accessible, cost-effective methods for diagnosing vitamin deficiencies. Modern technologies, particularly image processing and artificial intelligence, offer promising avenues for vitamin deficiency detection. Deep learning models can analyze images, but existing works suffer from providing real-time analysis and easy access solutions. In this project, hybrid deep learning model-based application to address the issue of vitamin Deficiency.

Vitamin deficiencies, stemming from inadequate dietary intake, malabsorption, or medical conditions, pose significant health risks worldwide. Despite medical advancements, over 90% of populations in regions such as the UAE and the United States suffer from at least one vitamin or mineral deficiency [7]

These deficiencies manifest in various forms, from mild symptoms to severe conditions like blindness and glossitis [1], [5], [9]. Early detection is crucial to prevent irreversible damage, as highlighted by cases of adult blindness secondary to vitamin A deficiency [1]. Studies have indicated the prevalence of anemia worldwide, often linked to nutritional deficiencies, emphasizing the global significance of this issue [7]. Additionally, vitamin B-12 deficiency is recognized as a common concern, affecting a significant portion of the population [8].

Traditional  methods of detecting vitamin deficiencies typically involve blood tests and laboratory analyses, which can be cost-prohibitive and inaccessible for many. Symptoms of these deficiencies can manifest visibly in different parts of the body, including the eyes, lips, tongue, and nails, presenting an opportunity for non-invasive detection through visual analysis[10]

Modern technologies, particularly image processing and artificial intelligence, offer promising avenues for vitamin deficiency detection. Deep learning models can analyze retinal images to detect diabetic eye diseases associated with deficiencies [3]. Likewise, artificial intelligence can accurately diagnose deficiencies by analyzing clinical features [2]

Given these challenges, there is a critical need for accessible, cost-effective methods for diagnosing vitamin deficiencies. To address this need, we introduce an innovative smartphone application that leverages artificial intelligence (AI) to detect vitamin deficiencies by analyzing images of specific body parts. This AI-based application empowers individuals to diagnose potential deficiencies without the need for blood samples or laboratory visits.

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