

# A computer based multimedia system for increasing the awareness of mechanical injury of potatoes

G.C. MISENER and L.P. McMILLAN

*Agriculture and Agri-Food Canada, Research Centre, P.O. Box 20280, Fredericton, NB, Canada E3B 4Z7. Received 15 July 1994; accepted 15 January 1995.*

Misener, G.C. and McMillan, L.P. 1995. *Can. Agric. Eng.* 37:063-065. **A computer based multimedia system for increasing the awareness of mechanical injury of potatoes.** A multimedia instructional package was developed to present the causes of mechanical injury of potatoes and to outline the preventive steps that might be taken to reduce the problem. The audience for the software package includes extension staff and potato growers. The software platform on which the package was developed was Director. This is an authoring system designed to create multimedia presentations and applications. The presentation runs on an IBM Compatible 386 PC under MS-Windows.

Nous avons élaboré un progiciel d'enseignement multimédia afin de présenter les causes des blessures mécaniques infligées aux pommes de terre et d'exposer les mesures préventives qui pourraient atténuer le problème. Le progiciel est destiné, entre autres, aux vulgarisateurs et aux cultivateurs de pommes de terre. La plate-forme logicielle "Director" a servi à l'élaboration du progiciel. Il s'agit d'un système-auteur conçu pour créer des présentations et des applications multimédia. La présentation tourne sur un "OP 386 compatible IBM en MS-Windows".

## INTRODUCTION

Knowledge-based methods can be instrumental in the transfer of information to the farming community. The organization and presentation of information in a readily accessible format allows concepts to be understood and applied. Thus, agricultural managers can operate their facilities more efficiently. Knowledge-based systems are now being applied more extensively in agriculture. For example, Whitaker et al. (1988) used a knowledge-based system for improved management of a dairy herd. Freeman and Ayers (1989) have applied this approach to farm machinery management and Freeman et al. (1993) developed systems for the knowledge-based delivery of rural assistance technology.

The use of a multimedia platform for extension education was explored by Lown and Prather (1993). They found that it could complement other technology transfer methods by offering sound, colour graphics, simulation, full-motion video, and user tasking/tracking. Beck et al. (1994) developed an electronic database of extension information based on CD-ROM technology. The system used an object-oriented approach to integrate hypertext, fulltext searching, relational databases, and expert systems.

The objective of the study reported in this paper was to develop a multimedia presentation on the causes and prevention of mechanical injury to potatoes. The presentation utilizes animation, digital voice overlap, scanned images, and text.

## DATABASE RESOURCE MATERIAL

The database is comprised of published research articles and extension bulletins as well as the authors' personal research results. Studies conducted by Misener et al. (1989) indicated that the amount of mechanical injury imparted to potatoes during harvesting and subsequent handling was the most significant factor affecting the percentage of marketable tubers. Normal mechanical harvesting, as conducted in New Brunswick, resulted in 60% more post storage losses of marketable potatoes than hand harvesting. Tuber injuries were evident in 80% by weight of the harvested potatoes. Causes for the high levels of tuber injuries have been reported by Hudson and Orr (1977), Hyde et al. (1979), McRae (198\_), and Peterson et al. (1975). Factors that influence the incidence of mechanical injury include soil type and temperature, maturity of the crop, variety, harvester design, and harvesting conditions. In recent studies, Larsson (1989) and Misener et al. (1992) found that the incidence of mechanical injury sustained by potatoes on packing lines was equivalent to or greater than that produced by the harvesting process.

## SOFTWARE SELECTION

The computer platform chosen for the development was the Macintosh system. The main software package used to develop the system was Director (Macromedia, San Francisco, CA) which is an authoring system to create multimedia presentations and applications. This package was chosen because it creates an environment where most details of a project can be completed. Photostyler (Aldus Corp., Seattle, WA), which is a MS-Windows graphics package, was used to convert scanned images from true colour to 256 colours. The images were also cropped with Photostyler so that they would meet the requirements of the program. Alchemy (Handmade Software Inc., Los Gatos, CA) was used to convert the scanned images to a format suitable for use by the Macintosh system.

MacLink Plus (Data Viz Inc., Trumbull, CT), which is a file transfer utility, was used to transfer the images.

Graphics were created either using Director or Photoshop (Aldus Corp., Seattle, WA). Sample Edit (Aston University, Birmingham, UK), which is a sound sampler and editor, was used to record and edit the voice modules. Finally, Setup Toolkit (Microsoft Corp., Redmond, CA) was used to create the install program for Windows. A flow chart listing the software packages and their functions utilized in the development of the system is displayed in Fig. 1. The finished product was delivered for IBM PC Compatible systems operating with Windows because of the availability of this type of computer at extension offices and on farms in eastern Canada. The final product consists of a presentation with animation, digital voice overlap, scanned images, text, and colour graphics. The duration of the presentation is approximately 10 minutes. The multimedia presentation was organized into six subheadings: effect of mechanical injury on the industry, injury identification, harvesting, unloading and loading at storage, grading line, and finally, testing for

mechanical injury.

The instructional package operates on an IBM Compatible 386 PC system given that the following hardware and software requirements are met:

- DOS 5.0 or higher and Windows 3.1 running in enhanced mode with at least 2MB of system memory.
- a 256 colour video display card with an appropriately installed Windows display driver.
- a Windows compatible sound card with an appropriately installed Windows multimedia extension driver.
- at least 17 MB of free hard disk space.

The project required approximately 2-3 months of development effort. During this period, an engineer familiar with knowledge based systems worked with the authors. The estimated cost of the development software packages required to create the mechanical injury project was \$3500. One step in the development of the project that could have been eliminated was the conversion from the Macintosh to the PC system. At the time of the development of the project, Director was only available for the Macintosh system. Now Director is available for the PC platform.

To date, the instructional package has been utilized at meetings such as the Atlantic Committee on Agricultural Engineering Workshop. Comments as to the capability of the multimedia presentation to effectively convey information and outline preventative measures to the audience (potato growers and agricultural engineers) have been favourable. A high degree of interest was expressed by potato growers and extension workers when the final project was demonstrated. The package will be made available to extension workers in Atlantic Canada for presentations at grower meetings as well as used in a kiosk setting at information centres.

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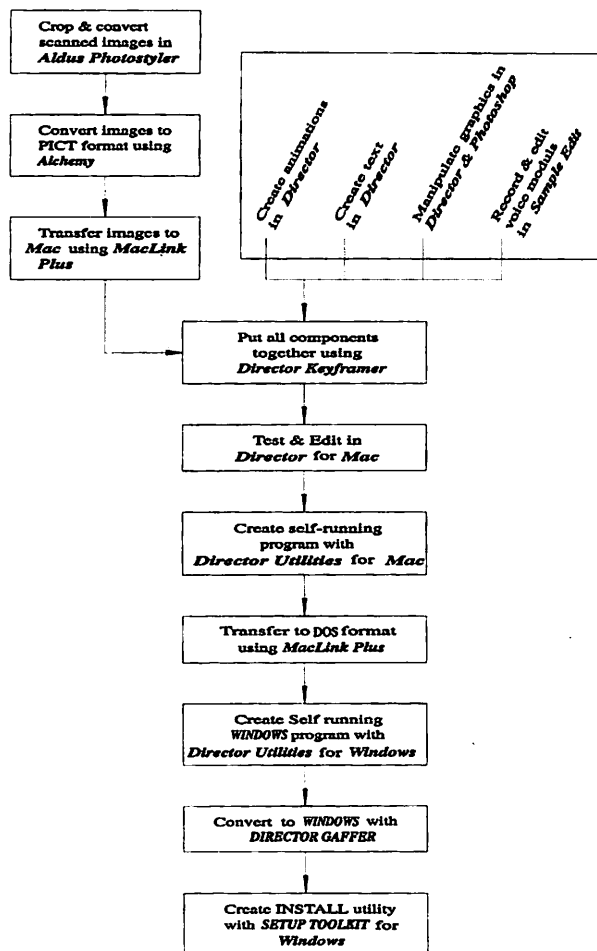


Fig. 1. Flow chart of the software development.

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